

Revision of *Astragalus* L. sect. *Malacothrix* Bunge (Leguminosae) in Iran

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Abstract:

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A revision of the genus *Astragalus* L. sect. *Malacothrix* Bunge in Iran including sect. *Heterozyx* Bunge and sect. *Bornmuelleriana* Sirj. & Rech.f. with 70 species is presented. The section is divided in 3 subsections and 29 informal groups. 12 species are described as new and 9 species are transferred from other sections to sect. *Malacothrix*. The types of all taxa and the investigated material are indicated, keys to the groups and species are given as well as distribution maps and flower dissections.

1. Introduction

The present work is the result of a longterm study of the genus *Astragalus* in Iran. During identification of the rich material in the big herbaria of Iran it became clear that the section *Malacothrix* is one of the larger and most complex groups of the genus in our country. It has reached a higher evolutionary level within the genus like sect. *Caprini* and contains a great number of species, some of them undescribed. There is no valuable treatment of this group as a whole available at present. Therefore the revisional study of the sect. *Malacothrix* was the main focal point of my work on the genus for the last five years.

In the present treatment all the species are grouped according to their natural affinities. There are some complex species groups as well as some more isolated species. To these groups I don't want to give any formal taxonomic rank, therefore no latin description is given for them.

2. Material and Methods

This investigation of the sect. *Malacothrix* is based on the rich material of the two big herbaria in Tehran (TARI and EVIN), but the material of the following and mostly newly established herbaria was also consulted:

- Herbarium of the Faculty of Science (Tehran)
- Herbarium of the Faculty of Agriculture (Mashhad)
- Herbarium of the Faculty of Science (Esfahan)
- Herbarium of the Faculty of Agriculture of Technical University (Esfahan)
- Herbarium of the Faculty of Science (Uroumieh)
- Herbarium of the Faculty of Agriculture (Azarbayejan)
- Herbarium of the Faculty of Pharmacy (Tehran)
- Herbarium of the Research Center of Esfahan.

For the verification of the named material I had the opportunity to examine the type specimens of most of the older species borrowed by Prof. Dr. D. PODLECH, Munich, from several European herbaria i.e.: B, G, G-BOIS, GOET, H, JE, K, LE, P, PR, W, WU.

I am grateful to Prof. PODLECH for his advice and discussion on different aspects of my work. I want to thank all the herbaria curators for their kind collaboration and for sending the valuable material. I wish to express my best thanks to my colleagues Mr. A. ASSADI and Mr. V. MOZAFARIAN for their collaboration in collecting interesting plant material. Without their help this work would never have been realized.

3. Taxonomic position of sect. *Malacothrix* Bunge within the genus

The sect. *Malacothrix* was placed by BUNGE (1868) into his subgenus *Hypoglottis* together with seven other big or small sections. This subgenus was mainly based on the morphological character of dense capitate or spikelike inflorescences. In recent systems (PODLECH 1982) this subgenus is no longer upheld because of nearly continuous transitions to other groups of the genus. The sections within this former subgenus in which the sect. *Malacothrix* has a central position are also not clearly defined. So it is not surprising, that some species must be transferred into other sections. Different peripheric species of sect. *Malacothrix* have some connections with other related sections:

1. The groups *A. pulchellus*, *A. senilis* and *A. inexpectatus* are allied to sect. *Dasyphyllium* by their contiguous leaflets.
2. The group *A. plebejus* and subsect. *Bornmuelleriana* show some connections to sect. *Stereothrix* by the setaceous calyx teeth.

Species transferred to or from Sect. *Malacothrix*:

Transferred species	from section	to section
<i>A. hirtus</i>	<i>Stereothrix</i>	<i>Malacothrix</i>
<i>A. saccatus</i>	<i>Grammocalyx</i>	<i>Malacothrix</i>
<i>A. aspadanus</i>	<i>Grammocalyx</i>	<i>Malacothrix</i>
<i>A. inexpectatus</i>	<i>Dasyphyllium</i>	<i>Malacothrix</i>
<i>A. deickianus</i>	<i>Dasyphyllium</i>	<i>Malacothrix</i>
<i>A. atricapillus</i>	<i>Malacothrix</i>	<i>Hypoglottidei</i>

4. Taxonomical characters

The following characters are of taxonomic importance for the definition of the section and the delimitation of the species within the section:

1. Indument:

We can find appressed hairs, subpatent hairs and spreading hairs. In these cases the plants are covered with a uniform indument. Sometimes different parts of the plants as stems, petiole, rachis and peduncle are covered with a double indument such as appressed hairs mixed with subpatent or spreading hairs or on the pod long lanate hairs mixed with shorter black or white spreading hairs. In some groups we can find hairs which are inserted in little tubercles, e.g. *A. hirtus* Bunge and *A. capillatus* Maass. with quadrangular tubercles in the vegetative parts and *A. pulchellus* Boiss. and *A. deickianus* with spherical tubercles on the pods.

2. Habitat:

The ecological adaptation to different habitats like high mountain or lowland areas are of great value. This is mostly connected with the general appearance of the plants, this i.e. size of the plants, the simple or divided caudex and others.

3. Stem:

The plants are acaulescent or the stems are well developed and either erect or prostrate or ascending. The kind of indument, the length of hairs and if the hairs are patent or appressed is of great taxonomic value.

4. Stipules:

All stipules are more or less adnate to the petiole at the base and jointed to each other behind the stem at different length. The length of adnation to the petiole is a useful character for separating related taxa.

5. Leaves:

The length of leaves and especially of the petiole are important characters. Species without petiole, e.g. *A. laristanicus* are easily distinguishable from those with a distinct petiole. The type of hairs in petiole and rachis are of great importance. We can find species with a simple indument of appressed or spreading hairs but also with double indument of long spreading and short appressed hairs.

6. Leaflets:

Size and shape of the leaflets are reliable characters. They may be remote to contiguous. The leaflets are glabrous above or hairy on both sides. The hairs are spreading or appressed.

7. Inflorescences:

The inflorescences are mostly dense at least at the beginning of anthesis, capitate or spikelike, with few to numerous nearly sessile to shortly pedicelled flowers, sometimes elongated when fruiting. They are shortly to long peduncled, the peduncle sometimes declined. These characters are of high taxonomic value.

8. Bracts:

Length, shape and indument of bracts are sometimes useful characters for separating taxa.

9. Calyx:

The shape, length, colour and indument of the calyx are important. Mostly the calyx is tubular, sometimes it is slightly to distinctly inflated, but in all cases it is ruptured by the ripe pod. The length of calyx teeth in relation to the tube is mostly a constant character. It varies from very short to somewhat longer than the tube.

10. Corolla:

The corolla is always glabrous and varies in colour. Some species have violet or purplish corolla and if carefully dried the colour will not change. Species with white corolla change mostly after drying into pale blue or violet, e.g. *A. tenuiscapus*. Plants with yellow corolla change the colour after drying often into dirty yellow or pale purplish but others remain yellow in the dried state. *A. podocarpus* has always a lemon yellow corolla.

11. Standard:

The shape of standard is a useful character. Five different types of standard shape are recognized:

1. Rhomboid standard with ligulate attenuate apex:

A great number of species have this kind of standard. The apex may be emarginate or deeply incised or bilobate (e.g. *A. eugenii* Grossh.) or acute (e.g. *A. indomitus* Mass.).

2. Rhomboid standard with short or nearly absent ligulate appendix:

In this case the general shape of the standard is rhomboid but the apex is very shortly attenuate (e.g. *A. mollis* M.Bieb., *A. chrysotrichus* Boiss. and *A. belgheisicus* Mass.).

3. Rhomboid-ovate standard:

In this case the shape is intermediate between ovate and rhomboid. The apex is in no way attenuate and nearly as broad as the middle parts. Only few species belong to this group (e.g. *A. pauperiflorus* Bornm., *A. tenuiscapus* Freyn & Bornm. and *A. melanodon* Boiss.).

4. Elliptic standard:

Only few species belong here (e.g. *A. termeanus* Maass. & Podlech and *A. laristanicus* Bornm. & Gauba).

5. Obovate standard:

In this case the apical part of standard is broader than the middle part (e.g. *A. iranicus*).

12. Wing-petals:

With few exceptions the general shape of wing-petals is not very useful for separating taxa. In some cases the dilatation of the limb towards the apex clearly define a species against its relatives, e.g. *A. mollis* M.Bieb against *A. takhtadzhani* Grossh. and *A. suluklensis* Freyn. In few species the limb is incised or asymmetrically notched at the apex.

13. Keel:

Although there are two different shapes of limb such as triangular and oblique-elliptic, this character was never used for separating taxa.

14. Pods:

Size and shape of the pods are useful characters. The *Astragalus plebejus* group for example has always remarkably small pods of 5-6 mm length. Several species have pods with a ± long stipe such as *A. podocarpus* C.A.Mey., *A. macrostachys* DC. and *A. eriocarpus* Boiss. but most have sessile pods. The apex may be straight or is ending into a recurved beak.

5. Taxonomic treatment of the section

- Astragalus** L. sect. **Malacothrix** Bunge in Mém. Acad. Imp. Sci. Saint Pétersbourg 11 (16): 54. 1868. Lectotypus: *A. mollis* M.Bieb. (PODLECH in Mitt. Bot. Staatss. München 29: 481. 1990).
 = Sect. *Heterozyx* Bunge in Mém. Acad. Imp. Sci. Saint Pétersbourg 11 (16): 53. 1868. Lectotypus *A. heterodoxus* Bunge (PODLECH in Mitt. Bot. Staatss. München 29: 477. 1990).
 = Sect. *Bornmuelleriana* Sirj. in Repert. Spec. Nov. Regni Veg. 52: 15. 1943. Lectotypus: *A. anserinaefolius* Boiss. (PODLECH in Mitt. Bot. Staatss. München 29: 466. 1990).

Plants perennial, acaulescent or caulescent. Stipules adnate to the petiole and jointed behind the stem to each other. Leaves imparipinnate, nearly sessile or with a distinct petiole; petiole and rachis densely covered with appressed or spreading white hairs, or mixed with black hairs. Leaflets opposite, alternate or very rarely verticillate. Inflorescences axillary or subterminal, with a short or long peduncle, densely capitate or oblong-elliptic or cylindric, forming a dense or loose spike. Bracts linear to narrowly triangular. Bracteoles absent. Flowers very shortly pedicelled. Calyx tubular, somewhat gibbous at the base, rarely inflated, but always ruptured by the pod, covered with white hairs or sometimes mixed with black hairs, the teeth narrowly triangular or setaceous, much shorter up to equaling the tube. Corolla glabrous, white, yellow or violet. Standard rhomboid with rounded apex or with a narrow ligulate appendix, or ovate-elliptic or obovate. Wing petals shorter than standard, the limb rounded at apex or rarely obliquely notched, auriculate at the base. Keel limb triangular or oblique-elliptic. Ovary pilose, sessile or stipitate. Pods ovoid or ellipsoid, sessile or stipitate, densely covered with lanate hairs or sometimes with mixed black and white, short spreading hairs, mostly fully bilocular.

6. Key to the groups

- | | | |
|----|--|------------------------------|
| 1 | Leaflets verticillate (partly) | Group <i>Heterodoxus</i> |
| - | Leaflets opposite or alternate | 2 |
| 2 | Limb of wing-petals retuse or emarginate dentate at apex | 3 |
| - | Limb of wing-petals rounded at apex | 4 |
| 3 | Limb of wing-petals retuse or tridentate at apex | Group <i>Pauperiflorus</i> |
| - | Limb of wing-petals asymmetrically emarginate at apex | Group <i>Galbineus</i> |
| 4 | Leaflets linear or narrowly elliptic | 5 |
| - | Leaflets ovate, elliptic or obovate | 8 |
| 5 | Plants stemless | 6 |
| - | Plants with developed stem | 7 |
| 6 | Standard ovate-oblong, flowers yellow | Group <i>Glochidiatus</i> |
| - | Standard rhomboid, flowers purplish | Group <i>Indomitus</i> |
| 7 | Standard obovate or orbicular, flowers yellow | Group <i>Podocarpus</i> |
| - | Standard rhomboid, flowers dark violet | Group <i>Macrostachys</i> |
| 8 | Calyx teeth equaling the tube or slightly longer | 9 |
| - | Calyx teeth 1/2 - 1/5 the length of tube | 10 |
| 9 | Calyx ca. 10 mm long, flowers yellow | Group <i>Plebejus</i> |
| - | Calyx ca. 15 mm long, flowers lilac or violet | Group <i>Anserinaefolius</i> |
| 10 | Leaflets densely covered with spreading or appressed hairs on both sides | 11 |
| - | Leaflets glabrous on upper side | 12 |
| 11 | Hairs inserted in little tubercles | Group <i>Hirtus</i> |
| - | Hairs without tubercles | 14 |

- 12 Flowers violet. Standard rhomboid, strongly ligulate-attenuate toward the apex
Group *Holopsilus*
- Flowers yellow. Standard rhomboid, not ligulate-attenuate toward the apex 13
- 13 Stipules densely covered with black and white or only with white hairs Group *Mollis*
- Stipules glabrous or ciliate at the margin, strongly rugose at the base
Group *Daghdaghabadensis*
- 14 Standard rhomboid in outline 15
- Standard ovate-oblong, obovate or orbicular 24
- 15 Plants with developed stem, stem ca. 20-30 cm long Group *Eriopodus*
- Plants with short stem ca. 5-10 cm or stemless 16
- 16 Inflorescence capitate or umbellate 17
- Inflorescence conical or cylindrical 22
- 17 Peduncle thick. Bracts ca. 8-10 mm, distinctly longer than the pedicel Group *Canosus*
- Peduncle thin. Bracts ca. 2-5 mm, distinctly shorter than the pedicel 18
- 18 Leaflets remote 19
- Leaflets contiguous, complicate 20
- 19 Standard rhomboid, ligulate-attenuate toward the apex Group *Holosemius*
- Standard rhomboid in outline, not attenuate toward the apex Group *Melanodon*
- 20 Pods ovoid, densely lanate, sessile Group *Inexpectatus*
- Pods ellipsoid, strongly attenuate toward the apex, stipitate, covered with hairs inserted
in little tubercles 21
- 21 Leaflets complicate Group *Senilis*
- Leaflets not as above Group *Pulchellus*
- 22 Standard rhomboid, strongly attenuate toward the apex, plants stemless, stipules
rugose at the base Group *Macrourus*
- Standard rhomboid, not ligulate-attenuate toward the apex, plant \pm with short or
long stem 23
- 23 Flowers yellow. Pods ellipsoid Group *Chrysotrichus*
- Flowers dark violet. Pods ovate Group *Rawlinsianus*
- 24 Leaflets densely covered with appressed hairs 25
- Leaflets densely covered with spreading hairs 27
- 25 Leaflets glabrous above, plant covered with very short hairs Group *Idoneus*
- Leaflets hairy on both sides, plant covered with long hairs 26
- 26 Plants caulescent, inflorescence elongate Group *Spachianus*
- Plants acaulescent, inflorescence umbellate Group *Patrius*
- 27 Petiole and rachis covered with long and short, spreading hairs Group *Iranicus*
- Petiole and rachis covered with long spreading hairs only 28
- 28 Leaflets covered with scattered hairs on upper side. Pods stipitate Group *Rivashensis*
- Leaflets densely covered on both sides. Pods sessile Group *Hendelanicus*

7. Key to species

- 1 Leaflets verticillate *A. heterodoxus*
- Leaflets alternate or opposite 2
- 2 Plants caulescent, stem up to 20 cm long 3
- Plants acaulescent or shortly caulescent, stem 10 cm long 11
- 3 Flowers yellow 4
- Flowers purplish or violet 5
- 4 Standard limb obovate. Leaflets linear *A. podocarpus*
- Standard limb rhomboid. Leaflets oblong-elliptic *A. chrysotrichus*
- 5 Leaflets linear *A. macrostachys*

- Leaflets ovate-elliptic or obovate 6
- 6 Calyx teeth setaceous, much longer than tube 7
- Calyx teeth subulate, shorter than tube 8
- 7 Calyx ca. 8-10 mm long. Leaves 2-4 cm long *A. anserinaefolius*
- Calyx ca. 14-18 mm long. Leaves 5-9 cm long *A. laristanicus*
- 8 Ovary stipitate. Leaflets covered with long spreading hairs 9
- Ovary sessile. Leaflets glabrous or with some scattered hairs on lower side 10
- 9 Bracts 10-12 mm. Wing-petals round-tipped, the limb as long as claw *A. eriopodus*
- Bracts 5 mm. Wing-petals asymmetrically notched or emarginate at the tip, the limb 1/2 as long as claw *A. vessalae*
- 10 Leaflets completely glabrous. Petiole ca. 5 mm long *A. holopsilus*
- Leaflets covered with short appressed hairs on lower side. Petiole ca. 2-4 (-5) cm long *A. lippertii*
- 11 Calyx teeth setaceous, as long as or slightly longer than tube 12
- Calyx teeth subulate or setaceous, 2-5 times shorter than tube 18
- 12 Small plants. Leaflets 4-7 pairs 13
- Not as above 15
- 13 Plants acaulescent. Calyx tube campanulate. Pods ca. 15 mm long *A. plebejus*
- Plants shortly caulescent. Calyx tube tubular. Pods ca. 7-8 mm long 14
- 14 Petiole equaling the limb, densely covered with appressed hairs *A. babakhanloui*
- Petiole much longer than the limb, densely covered with spreading hairs *A. chahartaghensis*
- 15 Calyx 8-10 mm long, leaflets complicate *A. anserinaefolius*
- Calyx 13-18 mm long 16
- 16 Stipules free from one another *A. ghahremanii*
- Stipules jointed to one another 17
- 17 Stipules 4-5 mm long, at a length of ca. 1 mm adnate to the petiole *A. termeanus*
- Stipules 8 mm long, at a length of ca. 2 mm adnate to the petiole *A. laristanicus*
- 18 Leaflets covered with long rigid hairs inserted on tubercles 19
- Leaflets densely covered with long or short, appressed or spreading hairs 20
- 19 Leaflets 8 pairs, densely covered with long, rigid hairs up to 4-4,5 mm long, inserted on rectangular tubercles *A. hirtus*
- Not as above *A. capillatus*
- 20 Standard limb oblong-elliptic, ovate or obovate, not ligulate-attenuate toward the apex 21
- Standard limb rhomboid, \pm ligulate-attenuate toward the apex 37
- 21 Bracts ovate triangular, 2-4 (-5) mm long, densely covered with black hairs 22
- Bracts triangular-linear, 7-20 mm long, \pm with black and white hairs 32
- 22 Leaflets linear *A. glochidiatus*
- Leaflets oblong-elliptic, ovate or obovate 23
- 23 Limb of wing-petals emarginate at apex or retuse 24
- Limb of wing-petals rounded at apex 25
- 24 Calyx covered with short appressed hairs, the teeth subulate *A. pauperiflorus*
- Calyx covered with long spreading hairs, the teeth setaceous, ca. 3-4 mm long *A. ghortapacensis*
- 25 Petiole, rachis and peduncle densely covered with spreading hairs 26
- Petiole, rachis and peduncle densely covered with appressed or subpatent hairs 31
- 26 Inflorescence capitate, 7-10 flowers. Leaflets contiguous. Plants 5-7 cm tall 27
- Inflorescence cylindric, 12-30 flowers. Leaflets remote. Plant 15-35 cm tall 28
- 27 Stipules ovate, free from one another *A. tenuiscapus*
- Stipules lanceolate, long jointed to one another *A. expectatus*
- 28 Petiole covered with long and short patent hairs. Standard ca. 23 mm long.

	Pods sessile	<i>A. griseus</i>	
-	Petiole covered densely with uniform spreading hairs		29
29	Pods sessile	<i>A. saccatus</i>	
-	Pods stipitate, stipe ca. 2 mm long.		30
30	Calyx teeth setaceous, 5-7 mm long	<i>A. perdurabilis</i>	
-	Calyx teeth subulate, 3-4 mm long	<i>A. rivashensis</i>	
31	Inflorescence capitate with 4-7 flowers	<i>A. patrius</i>	
-	Inflorescence elongate, cylindric with many flowers		32
32	Leaflets 9-10 pairs. Limb of wing-petals round-tipped	<i>A. spachianus</i>	
-	Leaflets 13-15 pairs. Limb of wing-petals asymmetrically emarginate at the tip	<i>A. ghoortapacensis</i>	
33	Leaflets \pm glabrous or with scattered hairs on upper side		34
-	Leaflets densely hairy on both sides		35
34	Peduncle covered with short appressed hairs. Pods covered only with long hairs	<i>A. leushanensis</i>	
-	Peduncle covered with short and long hairs. Pods with two kinds of hairs	<i>A. idoneus</i>	
35	Leaflets densely covered with spreading hairs	<i>A. iranicus</i>	
-	Leaflets densely covered with appressed or subappressed hairs		36
36	Petiole and rachis covered with uniform appressed hairs	<i>A. daghdaghabadensis</i>	
-	Petiole and rachis covered with long and short subappressed hairs	<i>A. inoblitus</i>	
37	Leaflets \pm glabrous on upper side or with some scattered hairs toward the margin		38
-	Leaflets densely hairy on both sides		53
38	Peduncle, rachis and leaflets completely glabrous	<i>A. holopsilus</i>	
-	Peduncle, rachis and lower side of leaflets \pm hairy		39
39	Flowers yellow or greenish		40
-	Flowers purplish or violet		48
40	Rachis and peduncle covered with spreading hairs		41
-	Rachis and peduncle glabrous or with appressed hairs		45
41	Leaflets 16-20 pairs		42
-	Leaflets 7-12 pairs		43
42	Leaflets 18-20 pairs. Inflorescence elongate	<i>A. typhaeformis</i>	
-	Leaflets ca. 16 pairs. Inflorescence a short spike	<i>A. caligineus</i>	
43	Leaflets 7-8 pairs	<i>A. belgheisicus</i>	
-	Leaflets 10-12 pairs		44
44	All hairs without tubercles	<i>A. mollis</i>	
-	Hairs inserted in rectangular tubercles at the base	<i>A. capillatus</i>	
45	Bracts shorter than calyx tube	<i>A. memnonius</i>	
-	Bracts equaling or longer than calyx tube		46
46	Bracts 15-20 mm long	<i>A. takhtadzhani</i>	
-	Bracts 7-10 (-12) mm long. Leaflets 8-13 (-16) pairs		47
47	Leaflets 12-13 (-16) pairs, oblong-elliptic. Standard emarginate	<i>A. alamouticus</i>	
-	Leaflets 9-10 pairs, narrowly elliptic. Standard subacute	<i>A. indomitus</i>	
48	Leaflets oblong, narrowly elliptic or linear		49
-	Leaflets obovate		52
49	Standard 16-20 (-21) long. Auricle of the wing ca. 2 mm long		50
-	Standard ca. 26 mm long. Auricle of the wing ca. 2,5 mm long	<i>A. birangae</i>	
50	Flowers yellow. Leaflets covered with scattered hairs on upper side	<i>A. pseudomacrostachys</i>	
-	Flower violet, leaflets glabrous above		51
51	Petiole and rachis covered with long and short hairs	<i>A. nahvandicus</i>	
-	Petiole and rachis covered only with long hairs	<i>A. leucotrichus</i>	
52	Leaflets 11-13 pairs	<i>A. lippertii</i>	

- Leaflets 15-20 pairs	<i>A. kabristanicus</i>	
53 Inflorescence elongate, cylindric or sometimes spherical, with many flowers		54
- Inflorescence short ovate or dense capitate, flowers few		68
54 Flowers purplish or pale violet		55
- Flowers yellow or greenish		56
55 Calyx 8 mm long. Standard ca. 18 mm long	<i>A. rawlinsianus</i>	
- Calyx 18-22 mm long. Standard 20-24 mm long	<i>A. suluklensis</i>	
56 Limb of wing-petals slightly emarginate		57
- Limb of wing-petals rounded or acute at apex		58
57 Leaflets with appressed hairs. Calyx teeth ca. 5 mm long	<i>A. galbineus</i>	
- Leaflets with spreading hairs. Calyx teeth ca. 3 mm long	<i>A. sarae</i>	
58 Plant scapose, acaulescent. Stipules distinctly rugose at the base		59
- Plant with a short stem 1-7 cm long		62
59 Inflorescence spherical or ovate	<i>A. holosemius</i>	
- Inflorescence cylindric, (-3) 8-12 (-20) cm long		60
60 Leaflets densely covered with appressed hairs. Limb of wing-petals attenuated toward the apex	<i>A. macrourus</i>	
- Leaflets glaucous, densely covered with long villous hairs, Limb of wing-petals dilated toward the apex		61
61 Leaflets imbricate, narrowly ovate, acutely by tipped	<i>A. elegans</i>	
- Leaflets remote, ovate-oblong or elliptic, obtusely by tipped	<i>A. eugenii</i>	
62 Stipules glabrous	<i>A. hendelanicus</i>	
- Stipules hairy		63
63 Leaflets 10-15 pairs		64
- Leaflets 18-20 pairs	<i>A. typhaeformis</i>	
64 Leaflets glabrous above or with some scattered hairs only		65
- Leaflets hairy on both sides		66
65 Leaflets obovate or obcordate, upper side with scattered hairs	<i>A. memnonius</i>	
- Leaflets narrowly elliptic, upper side glabrous	<i>A. khajiboulagensis</i>	
66 Pods covered with long hairs only	<i>A. canosus</i>	
- Pods covered with long and short spreading hairs		67
67 Petiole covered with short appressed hairs mixed with some isolated long hairs	<i>A. mollis</i>	
- Petiole covered with short spreading hairs	<i>A. pseudoantilibani</i>	
68 Limb of wing-petals tridentate at apex	<i>A. rudimentus</i>	
- Limb of wing-petals rounded or acute at apex		69
69 Inflorescence umbellate with few flowers		70
- Inflorescence capitate or cylindric with many flowers		81
70 Peduncle densely covered with appressed hairs		71
- Peduncle densely covered with short spreading hairs		78
71 Flowers white. Bracts linear ca. 6-7 mm long. Calyx teeth 4-5 mm long	<i>A. lisaricus</i>	
- Flowers violet. Bracts ovate ca. 2-3 mm long		72
72 Leaflets contiguous, complicate		73
- Leaflets not as above		77
73 Pods stipitate		74
- Pods sessile		76
74 Petiole ca. 1-2 cm long, covered with short hairs		75
- Petiole ca. 5 cm long, covered with long hairs	<i>A. senilis</i>	
75 Petiole covered with appressed hairs	<i>A. inclinatus</i>	
- Petiole covered with spreading hairs	<i>A. inexpectatus</i>	
76 Leaflets 6-7 pairs, elliptic ovate, not imbricate	<i>A. pulchellus</i>	
- Leaflets 9-11 pairs, obovate or orbicular, imbricate	<i>A. deickianus</i>	
77 Calyx tube not inflated. Leaflets oblong-elliptic, tip rounded	<i>A. beckii</i>	

- Calyx tube slightly inflated. Leaflets narrowly elliptic, acute	<i>A. aspadamus</i>
78 Calyx ca. 9 mm long	80
- Calyx ca. 11-12 mm long	79
79 Flowers white. Petiole covered with spreading hairs	<i>A. tenuiscapus</i>
- Flowers violet. Petiole with long and short subappressed hairs	<i>A. rusticus</i>
80 Pods sessile, densely lanate	<i>A. melanodon</i>
- Pods stipitate	81
81 Plant with developed stem, ca. 7 cm long	<i>A. pseudopulchellus</i>
- Plant acaulescent	<i>A. pulchellus</i>

I. Subject. Dasyphyloides Maassoumi subsect. nov.

Plantae perennes acaules vel breviter caulescentes. Foliola imbricata, in statu juvenile complicata. Legumen manifeste stipitatum, apice rostratum. **Typus subsectionis:** *A. pulchellus* Boiss.

1. *Astragalus senilis* group

Plants acaulescent. Leaflets ovate to orbicular, complicate, imbricate. Flowers violet. Standar rhomboid. Pods inflated.

A. senilis

1. *Astragalus senilis* Bornm. in Bull. Herb. Boiss. sér. 2, 5: 755. 1905. **Type:** Inter Rascht et Kazwin in trajectus charsan, in summo montis 2000 m, *Bornmüller 6729* (B) (n.v.).

Fig.: MAASSOUMI, A.A., 1990, Illustr. guide gen. Astrag. Iran 1: plate 93. (habit); pages 217 (indument of peduncle and pods) and 222 (flower dissection).

Plants acaulescent, 10-13 cm tall. Stipules 8-10 mm long, pilose, abruptly attenuate toward the apex, at the base adnate to the petiole and jointed to one another. Leaves ca. 11 cm long, petiole ca. 5 cm long, both petiole and rachis covered with scattered long hairs. Leaflets 12 pairs, contiguous, elliptic-oblong or obovate, ca. 10 mm long and 5 mm broad, pilose on both sides. Inflorescence a dense or loose spike, peduncle ca. 10 mm long, pilose. Flowers numerous with very short pedicels. Bracts linear, ca. 6 mm long, covered with black and white hairs. Calyx cylindric, ca. 12 mm long, vested with black and white hairs, the teeth subulate ca. 1-2 mm long. Corolla violet. Standard ca. 20 mm long, the limb rhomboid, constricted in the middle, ca. 9 mm broad, emarginate at apex. Wing-petals ca. 18 mm long, the limb narrowly elliptic, attenuate toward the apex, at the base auriculate, the limb slightly shorter than the claw. Keel ca. 16 mm long, the limb oblique-elliptic, slightly longer than the claw. Pods sessile, 20-23 mm long and 6 mm broad, terminating in slightly curved cuspidate beak ca. 4-5 mm long, carinate ventrally, sulcate dorsally, covered with long white bristle-like hairs, bilocular.

Specimens seen:

Tehran: Galanduak, Basti, 1780 m, 7.5.1974, *Sanii 11243* (TARI) - Road before Adaran, Arangeh mts., 1900 m, 13.5.1985, *Khatamsaz, Maassoumi & Abouhamzeh 52104* (TARI) - Nodehak, protected area, 1200 m, 12.5.1974, *Dini & Bazargan 8515* (TARI) - Zardband, 3.5.1974 (? , s.n.), Rudak, 2100 m, 7.11.1965, *Majda Zumer 233* (BG) - Touchal, Manzarriyeh, 1800-2500 m, 8.4.1966, *Majda Zumer 493* (BG).

Ghazvin: Abb-e Garm, Asiab to Ilderejin, 1700-2200 m, *Maassoumi & Mirhosseini 59419* (TARI).

2. *Astragalus inexpectatus* group

Plants acaulescent. Leaflets oblong-elliptic, imbricate. Peduncle recurved, densely covered with short spreading or appressed hairs. Pods inflated or not.

Astragalus inexpectatus, *A. expectatus*, *A. inclinatus*.

2. *Astragalus inexpectatus* Maassoumi & Podlech in Iran. J. Bot. 4: 77. 1988. **Holotype:** Esfahan, Boin, Tang-e dozdan, Kuh-e Balashtad, 2700-2900 m, 20.7.1981, *Nowroozi & Etemadi* (TARI!; Iso: Hb. PODLECH!).

Fig.: MAASSOUMI, A.A., l.c.: 78. (habit); - pages 219 (indument of peduncle and pod) and 222 (flower dissection).

Plants densely hairy, acaulescent, or shortly caulescent, stem ca. 2 cm long. Stipules ca. 5-7 mm long, greenish, pilose or ciliate, narrowly triangular, at the base adnate to the petiole and jointed to one another. Leaves 5-8 cm long, petiole ca. 1-2 cm long, densely covered with short spreading hairs. Leaflets imbricate, complicate, 8-10 pairs, oblong-elliptic, ca. 6-12 mm long and 3-6 mm broad, both sides densely covered with short spreading hairs. Inflorescence solitary, capitate, peduncle ca. 5-6 cm long, densely covered with short appressed hairs. Flowers numerous. Bracts ca. 4 mm long, linear, with black and white hairs. Pedicel ca. 2-3 mm long, pilose. Calyx tubular, ca. 10 mm long. Corolla yellow becoming violet. Standard ca. 16 mm long, the limb rhomboid, ca. 8 mm broad, emarginate at apex. Wing petals ca. 15 mm long, the limb oblong, ca. 8 mm long, rounded at apex. Keel ca. 12 mm long, the limb oblique-elliptic, equaling the claw. Ovary pilose, sessile. Pods sessile, ca. 15 mm long and 6 mm broad, oblique-elliptic, terminating in a beak ca. 3 mm long, ventrally carinate, dorsally deeply sulcate, incompletely bilocular.

Note: This species has been transferred from Sect. *Dasyphyllium* to Sect. *Malacothrix*.

Specimen seen:

Esfahan: Boin, Tang-e Dozdan, Kuh-e Balashtad, 2700-2900 m, 20.7.1981, *Nowroozi & Etemadi 1287* (TARI).

3. *Astragalus expectatus* Maassoumi in Mitt. Bot. Staatss. München 29: 503. 1990. **Holotype:** Fars, 20 km from Nurabad to Korekan, Doshman-Ziary region (WP2), 1800 m, 31.5.1983, *Mozaffarian 45716* (TARI).

Fig.: MAASSOUMI, A.A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 65. (habit); - page 219 (indument of peduncle and pod).

Plants acaulescent, procumbent, ca. 8 cm tall. Stipules 4-6 mm long, lanceolate, pilose, at the base shortly adnate to the petiole and jointed to one another. Leaves ca. 2-3,5 cm long, petiole very short, ca. 5-7 mm long, both petiole and rachis densely covered with white spreading hairs. Leaflets 7-8 pairs, contiguous, oblong or narrowly elliptic, complicate, ca. 5-8 mm long and 3-4 mm broad, both sides densely covered with spreading hairs. Inflorescence solitary. Flowers numerous in dense head. Peduncle ca. 6 cm long, densely covered with white

spreading hairs, toward the inflorescence mixed with black hairs. Bracts lanceolate, acuminate, ca. 6 mm long, covered with black and white hairs. Corolla yellow, changed to dark violet. Calyx tubular, ca. 12 mm long, white lanate, the teeth linear, ca. 4-5 mm long, densely covered with black and white hairs. Ovary pilose, sessile. Pods ovoid, ca. 11 mm long, and 5 mm broad, at the base shortly attenuate, at the apex rostrate, curvate, ventrally applanate-carinate, dorsally rounded, sulcate, densely covered with long white hairs, mixed with short spreading hairs, fully bilocular.

Specimen seen:

Fars: 20 km from Nurabad to Kore kan, Doshaman-ziary region (WP2), 1800 m, 31.5.1983, *Mozaffarian 45716* (TARI).

4. *Astragalus inclinatus* Maassoumi, sp. nov.

Species similar to *A. inexpectatus* Maassoumi & Podlech but it differs from this in having short appressed hairs on vegetative parts; from *A. griseus* Boiss. it differs in having a rhomboid standard limb (not oblong-elliptic).

Holotypus: Esfahan: Konsar to Buin-Miandasht, Kuh-e Sangandaz, 18.6.1986, 2700-3100 m, Termeh, *Tehrani & Karavar s.n.* (EVIN).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag.* Iran 2: plate 72. (habit); - plate 72 (habit); - pages 219 (indument of peduncle and pods) and 222 (flower dissection).

Plantae perennes, acaules, ca. 10 cm altae. Stipulae ovatae, triangulares, ca. 3-4 mm longae, appresse dense albi-nigri-pilosae, basi petiolo breviter adnatae, inter se connatae. Folia 4-5 cm longa, petiolo 7-10 mm longo, sicut rachis dense appresse piloso, foliola 11-12 juga, complicata, oblongi-elliptica ca. 8 mm longa et 3 mm lata, utrimque appresse pilosa. Inflorescentia solitaria, subcapitata, pedunculo 6,5-7 cm longo, dense brevissime appresse piloso sufulta. Bractee subulatae ca. 3 mm longae, patenter albi-nigri-pilosae. Calyx tubulosus, ca. 13 mm longus, distincte inflatus longitudinaliter atropurpurei-nervosus, albi-nigri-pilosus, dentibus linearibus ca. 3 mm longis. Corolla flava, demum violacea. Vexillum ca. 20 mm longum, lamina rhomboida, apicem versus ligulata, antice emarginata vel biloba. Alae ca. 16 mm longae, lamina anguste elliptica, antice rotundata, basi auricula ca. 1 mm longa provisa, ungue laminam aequante. Carina ca. 15 mm longa, lamina oblique elliptica. Ovarium pilosum, breviter stipitatum. Legumen elipsoideum, ca. 12 mm longum et 4 mm latum, apice rostratum, rostro curvato ca. 2 mm longo, ventre carinatum, dorso sulcatum, dense pilis longis et brevissimis obtectum, complete biloculare.

3. *Astragalus pulchellus* group

Plants acaulescent. Leaflets ovate-oblong or obovate, imbricate. Flowers violet. Standard limb rhomboid. Pods stipitate, terminating into a long beak, covered with scattered long hairs inserted in little tubercles.

Astragalus pulchellus, *A. deickianus*, *A. pseudopulchellus*.

5. *Astragalus pulchellus* Boiss., *Diagn. Pl. Or. Nov.* 2: 86. 1843; **Isotypes: Prope Ispahan, *Aucher Eloy 4426* (FI!, W!).**

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 93. (habit); pages 217 (indument of peduncle and pods) and 222 (flower dissection).

Plants acaulescent, ca. 5-6 cm tall. Stipules ca. 4-5 mm long, pilose, lanceolate, at a length of ca. 3 mm adnate to the petiole, jointed to one another. Leaves 5-7 cm long, petiole 1-1,5 cm, both petiole and rachis covered with spreading hairs. Leaflets 6-7 pairs, ovate-oblong, ca. 4-6 mm long and ca. 2 mm broad, hairy on both sides. Inflorescence with 9-10 flowers. Peduncle ca. 2-2.5 cm long, covered with spreading hairs. Bracts linear ca. 2 mm long, covered with white hairs or mixed with black and white hairs. Calyx tubular, ca. 7 mm long, covered with white hairs or mixed with black and white hairs, the teeth subulate ca. 1 mm long. Corolla purplish or violet. Standard ca. 16 mm long, the limb rhomboid, ca. 8 mm broad, shortly attenuated toward the tip. Wing petals ca. 12 mm long, the limb oblong-elliptic, rounded at apex, auriculate at the base, equaling the claw. Keel ca. 10 mm long, the limb oblique-elliptic, equaling the claw. Ovary pilose, sessile or stipitate. Pods ca. 13-14 mm long and 4 mm broad, attenuate toward the apex, rostrate-tipped, at the base distinctly stipitate, ventrally carinate, dorsally deeply sulcate, densely covered with hairs inserted in little tubercules, bilocular.

Note:

This species shows some similarity with *A. deickianus* which is largely distributed in the western parts of the country. It seems that the latter taxon has nearly the same variation in the size of the leaves and the calyx and further knowledge may lead to the subsumption of *A. deickianus* as a subspecies under *A. pulchellus*.

Specimens seen:

Fars: 60 km S Abadeh, Kuh-e Bul, near Eghlid, 2470 m, *Foroughi 17373* (TARI); 33,6 km S Deh-Bid, 2070 m, *Pabot 5912* (28589) (TARI); Ibidem, *Pabot 5925* (28588) (TARI).

Esfahan: Esfahan to Chadegan, Gardaneh Sorkh, 2200 m, *Nowroozi 209* (Esf); Chadegan, Menergan, 2300 m, *Nowroozi 202* (Esf.); Damaneh, 2100 m, 3.5.1974, no. 162; Borowjen, protected station, *Maassoumi 55161* (TARI).

Bakhtiari: Borowjen, Gandoman, Kuh-e Baraftab, 2300 m, *Mozaffarian 54769* (TARI).

Tehran: Qazvin, 1500-1550 m, 13.4.1963, *Jacobsen 6198* (BM).

Azarbayejan: Urmiyeh, Sheikh Tappeh, 28.5.1981, *Amini 1357* (TARI).

6. Astragalus deickianus Bornm. in *Notizbl. Bot. Gart. Berlin-Dahlem*, 14: 274. 1938. **Type:** zwischen Hamadan und Kasr Schirin, IV. 1935, *Deicke* (B) n.v.
= *A. aligudarzicus* Parsa, *Fl. de l'Iran* 9: 59. 1966. **Isotype:** Aligudarz, 3.1956, *Parsa?* (K!).

Fig.: MAASSOUMI, A. A., 1990, *Illustr. guide gen. Astrag. Iran 1*: plate 82. (habit); - pages 217 (indument of peduncle and pods) and 222 (flower dissection).

Plants acaulescent, 10-13 cm tall. Stipules 6-8 mm long, pilose, at a length of 3-4 mm adnate to the petiole and jointed to one another. Leaves 5-6 cm long, petiole ca. 1-2 cm. Leaflets 9-11 pairs, contiguous, elliptic or obovate, 6-8 mm long and 4 mm broad, pilose on both sides. Inflorescence a dense spike, peduncle 7-8 cm long. Bracts linear, ca. 4 mm long, covered with black and white hairs. Calyx tubular, ca. 8 mm long, covered with black and white hairs, the teeth subulate, 1-2 mm long. Corolla violet. Standard 17 mm long, the limb rhomboid, 7 mm broad, at the apex truncate or emarginate. Wing petals 15 mm long, the limb narrowly elliptic, in upper part attenuate, at the base auriculate, the limb equaling the claw.

Keel 13 mm long, the limb elliptic, shortly curved, the claw slightly longer than the limb. Ovary pilose, stipitate. Pods with a stipe ca. 3-4 mm long, ca. 20 mm long and 4 mm broad, terminating in a long recurved subulate beak ca. 3-4 mm long, ventrally carinate, dorsally sulcate, covered with long white bristle-like hairs, bilocular.

Specimens seen:

Bakhtiari: Borujen, protected station, 2120 m, 24.5.1986, *Mozaffarian 54401* (TARI).

Kordestan: Dasht-e Zaghe, on road from Hamadan to Sanandaje, ca. 40 km E of Sanandaje, 2200 m, 11.5.1975, *Wendelbo & Assadi 1988* (TARI) - West central Kordestan, 1500-1700 m, 16.5.1963, *Jacobsen 6596* (BM).

Hamadan: Avadje, Sultan-Bulagh mts. 2000-2400 m, 13.5.1987, *Maassoumi & Abouhamzeh 59381, 59384* (TARI) - Ecbatan sad to Yalfan village 2000 m, 10.5.1087, *Maassoumi 5933*, (TARI); ca. 20 km from Ecbatan sad on the road to Malayer, S. of Yalfan village, 16.5.1985, *Maassoumi 52094* (TARI).

Zanjan: Lelaveh to Tahan, 1800-2200 m, 8 Jun, 1977, *Moussavi & Tehrani 36819* (Evin)

7. *Astragalus pseudopulchellus* Maassoumi sp. nov.

Plant distinguishable from its nearest relatives *A. pulchellus* Boiss., *A. deickianus* Bornm. and *A. senilis* Bornm. by the well developed stem, the abruptly acuminate stipules and the short fruit.

Holotypus: Lorestan: 55 km from Arak to Malayer (UT3) 2100 m, 15.6.1984, *Mozaffarian & Maassoumi 48087* (TARI!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 92. (habit); page 219 (indument of peduncle and pods).

Plantae, caulescentes ca. 25 cm altae. Caudex multiceps. Caules ca. 7 cm longi, crassi, subpatenter albipilosi. Stipulae ovatae, appresse albo-pilosae, margine ciliatae, distincte nervosae apicem versus abrupte attenuatae, at a length of ca. 3 mm petiolo adnatae, inter se connatae. Folia 10-14 cm longa, petiolo ca. 3-4 cm longo, sicut rachis dense patenter piloso. Foliola ca. 11-13 juga, complicata, juvenilia imbricata, utrimque appresse pilosa, ca. 10 mm longa et 4-6 mm lata, apice rotundata ver emarginata. Inflorescentiae axillares, pedunculo (5-) 10-12 cm longo, laxiuscule brevissime patenter piloso suffultae. Bractae subulatae, ca. 4-5 mm longae, albi-nigri-pilosae. Calyx tubulosus ca. 8-9 mm longus, purpureus, albi-nigri-pilosus, dentibus subulatis ca. 2 mm longis. Corolla violacea (in sicco). Vexillum 17 mm longum, lamina rhomboida, ca. 8 mm lata, apice emarginata. Alae carinaeque ignotae. Ovarium pilosum, stipitatum. Legumen stipe ca. 1,5-2 mm longo suffultum, ellipsoideum, apicem versus attenuatum, antice rostratum, rostro ca. 2-3 mm longo, ventre carinatum, dorso rotundatum et profunde sulcatum, dense pilis patentibus in tuberculis minutis insidentibus obtectum pilosum, complete biloculare.

II. Subsect. Malacothrix

Plants caulescent or acaulescent. Leaflets remote, very rarely contiguous, ovate-oblong or elliptic, sometimes linear. Flowers yellow or violet. Standard obovate or rhomboid. Pods sessile or stipitate.

4. *Astragalus pauperiflorus* group

Small herbs with short leaves and small leaflets, covered with short appressed hairs. The limb of wing petals retuse or minutely tridentate. Standard rhomboid, not ligulate-attenuate toward the apex. Bracts subulate. Calyx shortly tubular, the teeth shorter than tube.

Astragalus pauperiflorus, *A. rudimentus*.

8. *Astragalus pauperiflorus* Bornm. in Mitth. Thür. Bot. Ver., N. F. 23: 4. 1908. **Holotype:** Azarbayejan: prope Isperechan, in montis Sahand, *Knapp* (WU!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag.* Iran 2: plate 88. (habit); pages 221 (indument of peduncle and pods) and 222 (flower dissection).

Plants small, prostrate on the soil surface, ca. 3-5 cm tall, acaulescent or with a short stem up to 1,5 cm long. Stipules membranous, ca. 3-4 mm long, glabrous, ciliate at the margin, at the base shortly adnate to the petiole and shortly jointed to one another. Leaves ca. 2-4 cm long, petiole ca. 1 cm long, both petiole and rachis covered with short appressed hairs. Leaflets ca. 11 pairs, obovate or elliptic, ca. 4 mm long and 2 mm broad, upper side glabrous, lower side with short appressed hairs along the mid-rib, shortly pilose at the margin. Inflorescences spike-like, peduncle 1-2 cm long, covered with short appressed white hairs or mixed with some black hairs. Flowers 6-8, nearly sessile. Bracts small, ca. 1 mm long, membranous, at the margin with white hairs or mixed with black hairs. Calyx tubular, ca. 6 mm long, covered with white hairs or mixed with blackish hairs, the teeth triangular, ca. 1-2 mm long. Corolla yellow with violet keel. Standard ca. 14 mm long, the limb elliptic or obovate, incised at the apex, constricted at the base near to the claw. Wing petals ca. 12 mm long, the limb elliptic, asymmetrically notched at the apex, at the base with an auricle ca. 1,5 mm long, claw equaling the limb. Keel ca. 9 mm long, the limb elliptic-recurved, acuminate, claw longer than the limb. Ovary pilose, sessile. Pod (immature) ca. 3 mm long and 1,5 mm broad, covered with long hairs.

Specimens seen:

Azarbayejan: Sarab, Kuh-e Goush 2000-3100 m, *Izadyar 14695* (Evin); Kuh-e Sabalan, 2960 m, *Riazi 7496* (TARI); Irydash (Savalan), 2850 m, *Javanshir 693* (University of Tabriz).

9. *Astragalus rudimentus* Maassoumi in Iran. *J. Botany* 5: 14. 1991. **Holotype:** Azarbayejan, Ardebil to Ghotour-Sou, Kuh-e Sabalan, 3400-3600 m, 15.7.1971, *Termeh 40821*. (Evin!; Iso: TARI!)

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag.* Iran 2: plate 95. (habit); - pages 219 (indument of peduncle and pods) and 222 (flower dissection).

Plants acaulescent, small, ca. 4-6 cm tall with divided caudex. Stipules lanceolate, covered with white hairs, 3-4 mm long, at a length of ca. 1 mm adnate to the petiole and shortly jointed to one another. Leaves ca. 2-2.5 cm long, petiole ca. 5-6 mm long, petiole and rachis densely covered with white appressed hairs. Leaflets imbricate, ca. 8-10 pairs, elliptic or lanceolate, ca. 4 mm long and 1-2 mm broad, both sides densely covered with appressed hairs. Inflorescence nearly capitate, 5-6 flowered, peduncle ca. 2,5-3 (-5) cm long, straight or recurved, densely covered with white appressed hairs at the base, toward the inflorescence mixed with black hairs. Bracts narrowly ovate with black and white hairs, ca. 3 mm long. Calyx tubular, ca. 10-

11 mm long, covered with black and spreading white hairs. Corolla yellow, changed to violet. Standard ca. 14-15 mm long, the limb rhomboid, in the middle part ca. 6 mm broad. Wing petals ca. 11 mm long, the limb narrowly elliptic, at the apex minutely dentate, at the base with an auricle ca. 1 mm long, the limb equaling the claw. Keel ca. 10 mm long, the limb oblique-elliptic, equaling the claw. Ovary sessile, pilose. Pods ovoid, ca. 6-7 mm long and 4 mm broad, recurved at the apex, ventrally rounded, dorsally applanate and sulcate, densely covered with long white hairs mixed with short spreading hairs, bilocular.

Specimens seen:

Azarbayejan: Ardebil to Ghotour-Sou, Kuh-e Sabalan, 3400-3600 m, 15.7.1971, *Termeh 40821*. (Evin; TARI) Osku to Sahand, Kuh-e Soltan, 2600-3130 m, 22.6.1985, *Termeh, Moussavi & Tehrani 41595* (EVIN); N. of Savalan, 3500-3800 m, 30.8.1987, *A. Javanshir 1263* (University of Tabriz); mt. Savalan, Herman mts. 3500-3800 m, 29.7.1987, *A. Javanshir 1251* (UT); Yekly Yeyglaghy (Sabalan mt.) 3420 m, 29.5.1987, *Javanshir 19741* (UT); Savalan 2935-3410 m, 18.8.1986, *Javanshir 1074* (UT); Sarab to Sabalan, 24.7.1968, *Termeh 13325* (EVIN); *ibidem*, *Rechinger, Lamond & Termeh 44190* (W).

5. *Astragalus melanodon* group

Plants scapose, acaulescent or very shortly caulescent. Bracts subulate, densely covered with black hairs. Calyx tubular, the teeth triangular, much shorter than the calyx tube. Peduncle much longer than the subtending leaves, recurved. Flowers white. Standard rhomboid, not ligulate-attenuate toward the apex, or obovate.

Astragalus melanodon, *A. tenuiscapus*, *A. griseus*.

10. *Astragalus melanodon* Boiss., *Diagn. Pl. Or. Nov.* 6: 36 (1846). **Type:** In summis alpis Kuh-e Daena, *Th. Kotschy 765* (FII, W!).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag.* Iran 2: plate 83. (habit); - pages 218 (indument of peduncle and pods) and 222 (flower dissection).

Plants ca. 10-16 cm tall, with stems ca. 3-5 cm long. Stipules triangular-acuminate, ca. 4 mm long, at the base free from the petiole and shortly jointed to one another. Leaves 4-9 cm long, petiole ca. 3-4 cm, both petiole and rachis covered with short appressed or subpatent hairs. Leaflets 5-6 pairs, elliptic, ca. 12-16 mm long and 3-5 mm broad, both sides covered with appressed hairs. Inflorescence a dense spike with numerous flowers, peduncle ca. 4-6 cm long, covered with short, black and white hairs. Bracts narrowly ovate, ca. 2 mm long, with black and white hairs. Calyx cylindric, ca. 7-8 mm long, covered with black and white hairs, the teeth subulate, ca. 1 mm long. Corolla yellow. Standard ca. 15 mm long, the limb rhomboid, round-tipped or round-tipped. Wing petals ca. 12-13 mm long, the limb elliptic, round-tipped or roundly-tipped at the base with an auricle ca. 1 mm long, shortly longer than the claw. Keel ca. 11 mm long, the limb oblique-elliptic or triangular, shorter than the claw. Ovary pilose, sessile. Legume unknown.

Specimens seen:

Yazd: W. of Yazd, Terejan, Barf-Khaneh, 3350 m, 23.6.1975, *Foroughi & Assadi 18024* (TARI).
Semnan: Shahrud, Gharich-ye Tash, Kuh-e Shahvar, 3000-3650 m, 31. July 1975 (EVIN).

Fars: Kuh-e Nav, Kuh-e March, Bonrud, 5.6.1968 (EVIN); Kuh-e Daena 3500 m, Sept. 1955, 5243 E (EVIN); Dena Sitsehani (Sisakht), 2.8.49, 1088 (EVIN); Kuh-e Dena, Darreh Sicani, 21.7.49, 1080 E (EVIN); Abadeh, Kouh-e Dena, Gardaneh-Ye Bijan 3030 m, 25.7.1987, *Termeh, Delghan & Tehrani* (EVIN); Kuh-e Dena, Gadaneh Bijan, 3500-3900 m, 2.8.1978, *Assadi & Mozaffarian 31241, 31226* (TARI).

Kerman: Kuh-e Jebal-Barez, 35 km ab oppido Jiroft, 1600-3000 m, 4.5.1973, *Sojak 4152, 4177* (PR).

11. *Astragalus tenuiscapus* Freyn et Bornm. in Bull. Herb. Boiss. 5: 590. 1897. Type: Kerman, inter lapides ad nives deliquescentes montis Kuh-e Lalezar, 3900-4000 m, *Bornmüller 3777* (B, non vidi).

Fig.: Pages 218 (indument of peduncle and pods) and 222 (flower dissection).

Plants acaulescent, ca. 6-8 cm tall, with branched caudex and stems prostrate at the surface of the soil. Stipules ca. 3 mm long, covered with spreading hairs. Leaves ca. 2-3 cm long, petiole short, both petiole and rachis densely covered with spreading hairs. Leaflets 8-9 pairs, obovate, ca. 5 mm long and 4 mm broad, complicate, both sides densely covered with spreading hairs. Inflorescence a dense spike or capitate; peduncle ca. 3-5 cm long, thin, usually deflexed, densely covered with spreading black and white hairs; flowers 8-10, nearly sessile. Bracts ovate, ca. 1-2 mm long, covered with spreading black and white hairs. Calyx tubular, ca. 9-10 mm long, densely covered with black hairs or mixed with white hairs, the teeth subulate, ca. 3 mm long. Corolla white. Standard ca. 18 mm long, the limb rhomboid, ca. 9 mm broad, round tipped, at the base near the claw constricted. Wing-petals ca. 15 mm long, the limb elliptic, round tipped, at the base auriculate, auricle ca. 1 mm long, claw shorter than the limb. Keel ca. 14 mm long, the limb oblique elliptic, claw longer than the limb. Ovary pilose, shortly stipitate. Pods ovoid, ca. 12 mm long and 7 mm broad, ventrally rounded, dorsally sulcate, valves of the pod membranous, thin, covered with long silky whitish hairs mixed with short spreading blackish hairs, semi-bilocular.

Specimens seen:

Esfahan: N side of Kuh-e Dena, above the village Noghol, 3500-4000 m, 6.7.1983, *Assadi & Abouhamzeh 46164* (TARI).

Fars: Kuh-e Dena, Gardaneh-e Bijan, 3000-3600 m, *Assadi & Mozaffarian 31174* (TARI); Kuh-e Dena, supra Sissakht, 3400-4000 m, 14.6.1977, *Sojak 6349, 6193, 6240* (PR).

Kerman: Darzin to Deh Bakry, 1750 m, *Jaafary & Heravi* (EVIN); Kerman, Laleh Zar, Baghabad, 2900 m, 19.6.1975, *Foroughi & Assadi 17907* (TARI); Baft, Kuh-e Laleh Zar to Gholleh Shah, 3000-3800 m, 30.5.1975, *Moussavi & Tehrani s.n.* (EVIN); S slope of Kuh-e Khabr, 3500 m, 8.6.1977, *Assadi & Miller 2519* (TARI).

12. *Astragalus griseus* Boiss., Diagn. Pl. Or. Nov. 6: 36. 1846. Type: in siccis reg. superiorum alpibus Kuh-Delu, *Th. Kotschy 527* (G!, FII!, K!, W!).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 69.* (habit); - pages 218 (indument of peduncle and pods) and 222 (flower dissection).

Plants ca. 8-13 cm tall, caulescent. Stipules triangular, ca. 8 mm long, covered with white hairs or mixed with black hairs, at the length of ca. 1 mm adnate to the petiole. Leaves ca. 5-8 cm long, petiole short, ca. 2 cm long, both petiole and rachis sulcate, covered with long white hairs mixed with short spreading hairs. Leaflets 9 pairs, complicate, covered with silvery

appressed hairs, elliptic or obovate, ca. 6 mm long and 4 mm broad. Inflorescence subterminal, capitate, peduncle ca. 3-10 cm long, at the base covered with long and short whitish hairs, and below the inflorescence mixed with short blackish hairs: flowers numerous with very short pedicel. Bracts lanceolate, ca. 5-6 mm long, covered with black and white hairs or rarely only with white hairs. Calyx tubular, ca. 12-13 mm long, covered with black and white hairs, the teeth subulate, ca. 2-3 mm long. Standard ca. 16 mm long, the limb rhomboid, at the tip incised or shortly emarginate, at the base near the claw constricted. Wing-petals ca. 15 mm long, the limb elliptic, toward the apex shortly attenuate, round tipped, at the base auriculate, the claw 2 times longer than the limb. Keel ca. 12 mm long, the limb triangular or curved, acute at the apex, the claw 2 times longer than the limb. Ovary pilose, sessile. Pod ovoid, sessile, ca. 7-8 mm long and 4 mm broad, ventrally carinate, dorsally sulcate, at the apex terminating in a recurved beak, covered with long soft whitish or yellowish hairs mixed with short spreading white hairs, bilocular.

Specimens seen:

Fars: Bamu protected region, Cheshmeh Fil to ridge of Kuh-Bamu, 1900-2650 m, 31.5.1975, *Wendelbo & Foroughi 11691* (TARI); Kuh-Mareh, *Bonroud, Kashkouli & Misayans s.n.* (EVIN).

Bakhtiari: Prope Semirrom, Kuh-e Surmandeh, 2750-3600 m, 7.6.1974, *Iranshahr* (EVIN).

6. *Astragalus holosemius* group

Scapose, acaulescent. Bracts narrowly ovate, densely covered with black and white hairs. Calyx tubular minutely inflated, the teeth triangular, shorter than the calyx tube, peduncle longer than or equaling the subtending leaves, erect. Flowers violet. Standard rhomboid, attenuate toward the apex.

Astragalus holosemius, *A. beckii*, *A. rusticus*, *A. aspadanus*, *A. lisaricus*.

13. *Astragalus holosemius* Bunge. in *Mém. Acad. Imp. Sci. Saint-Petersbourg* 11 (16): 55. 1868 in clave et l.c. 15 (1): 89. 1869; **Type:** Prov. Azarbayejan, *Aucher-Eloy 4418* (FI!, K!).

Fig.: Page 222 (flower dissection).

Plants ca. 15-25 cm tall, acaulescent or shortly caulescent, stems ca. 2 cm long, from a much divided stock. Stipules narrowly triangular, acuminate, divergent, pilose, ca. 5-7 mm long, at the base shortly adnate to the petiole and jointed to one another, rugulose at the base. Leaflets 14-16 pairs, narrowly elliptic or ovate-oblong, obtuse or acuminate, ca. 10-12 mm long and 5-7 mm broad, both sides densely covered with appressed hairs. Inflorescence long pedunculated, capitate, with numerous, shortly pedicellated flowers. Bracts subulate, densely covered with black hairs, ca. 5 mm long. Calyx tubular, very rarely slightly inflated, ca. 12-14 mm long, densely covered with spreading black and white hairs, the teeth subulate ca. 2-3 mm long. Corolla purplish or violet. Standard 22-27 mm long, the limb rhomboid, ca. 8-9 mm broad, ligulate-attenuate toward the apex. Wing-petals ca. 18-20 mm long, the limb elliptic, minutely asymmetrically dentate at the apex, at the base auriculate, auricle ca. 2 mm long, claw longer than the limb. Keel ca. 15-18 mm long, the limb oblique-elliptic, claw longer than the limb. Ovary pilose. Pods ellipsoid ca. 10-13 mm long, attenuate toward the apex, ventrally carinate, dorsally applanate, sulcate, densely vested with long white or yellow hairs mixed with short spreading hairs, fully bilocular.

Specimens seen:

Azərbaycan: 22 km SW Ahar, 1550 m, *Pabot 3259* (28579) (TARI); Between Khalkhal and Ardebil, protected area of Lisar, 2500 m, *Maassoumi & Abouhamzeh 56940* (TARI); Sarab, Narmigh mts., 220-2400 m, *Termeh & Daneshpajuh 41366* (EVIN); Montes Sabalan, Qotur-Su, 2300-2800 m, *Lamond & Termeh 440070* (EVIN); Kiamaki protected region, in monte Mohammad-Saleh, 2600-2900 m, *Rechinger 56921*(W); Kuh-s Sahand, 2200-2900 m, *Assadi & Mozaffarian 30665* (TARI).

14. *Astragalus beckii* Bornm. in Mitth. Thüring. Bot. Ver., N.S. 23: 5. 1908. **Type:** In valle fluvii Sefid-rud in montium prope Rudbar, 7.5.1902, *Bornmüller 6770* (E!).

= *A. stridii* Kit Tan in Aliso 11: 621. 1987. **Holotype:** Turkey, C5 Nigde: Narpiz valley, NW part of Aladagh, ca. 6 km SE of Demirkazik köyü, limestone scree and rock, 2800-3000 m, 23.7.1984, *G. Görk, P. Hartvig & A. Strid* et al. 23923 (C; Iso: E!).

Fig.: MAASSOUMI, A.A., 1990, Illustr. guide gen. Astrag. Iran 1: plate 81 (habit); - pages 218 (indument of peduncle and pods) and 222 (flower dissection).

Plants ca. 15-20 cm tall, stems 1-2 cm long with very short internodes at the base. Stipules triangular, pilose, ca. 2-3 mm long, at the base nearly free from the petiole and shortly jointed to one another. Leaves 5-6 (-13) cm long, petiole ca. 2 cm long, both petiole and rachis covered with short appressed hairs. Leaflets 10-12 pairs, oblong-elliptic, obtuse, rounded at apex or very rarely emarginately tipped, 5-8 mm long and 3-5 mm broad, both sides covered with appressed hairs. Inflorescence at first a dense spike and elongating in flower. Peduncle ca. 6-11 cm long, at the base covered with appressed white hairs and below the inflorescence mixed with nearly spreading black hairs; flowers 7-15, with very short pedicel. Bracts ca. 3 mm long, covered with black and white hairs. Calyx tubular, ca. 12-13 mm long, covered with black and white hairs, the teeth triangular, ca. 2 mm long. Corolla violet. Standard ca. 20-23 mm long, the limb rhomboid, ca. 8 mm broad, distinctly attenuated towards the apex, emarginately tipped or bilobate. Wing-petals ca. 18 mm long, the limb narrow-elliptic, asymmetrically notched at apex, at the base auriculate, with auricle ca. 1.5 mm long, the limb slightly shorter than the claw. Keel ca. 15 mm long, the limb oblique-elliptic, 1/2 length of the claw. Ovary pilose, shortly stipitate. Fruit (immature) ca. 10 mm long covered with long soft hairs, bilocular.

Notes: This species is in some respects similar to *A. melanodon* Boiss. and *A. tenuiscapus* Freyn & Bornm., but it differs in having much longer calyx (ca. 12-13 mm) and in the standard limb shape which is strongly ligulate toward the apex.

Specimens seen:

Mazandaran: N side of Kandavan tunnel, 2600 m, 23.5.1974, *Wendelbo & Shirdelpur 11659* (TARI); Haraz road at Abgarm, 2250 m, 23.6.1979, *Assadi & Mozaffarian, 33119* (TARI).

Tehran: Qazvin, 37 km from Qazvin to Manil (Kuhin neck), 1300 m, 3.6.1986, *Maassoumi 55150* (TARI); Chalus road, top region of Kandavan mts., 3000 m, 3.6.1986, *Maassoumi 55119* (TARI).

15. *Astragalus rusticus* Maassoumi in Mitt. Bot. Staats. München, 29: 506 (1990); **Holotype:** Azərbaycan, Kandovan road to Esfanjan, before of Kuhnamaku, 2090 m, 21.5.1981, *Olfat & Sarkarat 233* (TARI!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 96 (habit); - pages 219 (indument of peduncle and pods) and 222 (flower dissection).

Plants acaulescent, ca. 10-11 cm tall. Stipules lanceolate, ca. 5-8 mm long, covered with white hairs, at a length of ca. 2 mm adnate to the petiole and jointed to one another. Leaves ca. 5-6 cm long, petiole ca. 1-1,5 cm long, both petiole and rachis densely covered with long and short subappressed hairs. Leaflets ca. 11-12 pairs, narrowly elliptic, acuminate or rarely obtuse, ca. 5-7 mm long and 2-3 mm broad, upper side covered with subappressed hairs, lower side with appressed hairs. Inflorescence solitary, 7-9 flowered; peduncle ca. 5-6 cm long, densely covered with long and short spreading hairs. Bracts lanceolate, ca. 5-6 mm long, covered with black and white hairs. Calyx tubular ca. 11-12 mm long, covered with long white hairs mixed with short black hairs, the teeth linear, ca. 3-3,5 mm long. Corolla dark violet. Standard ca. 18 mm long, the limb rhomboid, emarginate at the apex. Wing-petals ca. 17 mm long, the limb oblong, dilated toward the apex, at the base shortly auriculate, the limb equaling the claw. Keel ca. 15 mm long, the limb elliptic. Ovary pilose, stipitate. Pods unknown.

Specimens seen:

Azarbayejan: Kandowan road to Esfanjan, before of Kuhnamaku, 2090 m, 21.5.1981, *Olfat & Sarkarat 233* (TARI).

16. *Astragalus aspadanus* Bunge in *Mém. Acad. Imp. Sci. Saint-Petersbourg* 11(16): 63. 1868 in *clave et l.c.* 15 (1): 107. 1869. **Holotypus:** In Persia media occidentali prope Isfahan, *Bode* (LE) non vidi.

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 57 (habit).

Plants acaulescent, with much divided stock, ca. 17 cm tall. Stipules lanceolate, acuminate, pilose, ca. 5-7 mm long, at the base shortly adnate to the petiole, jointed to one another. Leaflets 14-16 pairs, ovate-oblong, rounded at apex, ca. 10 mm long and 4-5 mm broad, both sides covered with appressed hairs. Inflorescence capitata, with many flowers; peduncle 10-15 cm long, densely covered with appressed hairs. Bracts linear, covered with black hairs, ca. 5 mm long. Calyx tubular, ca. 13 mm long, strongly inflated at the base, densely covered with black and white spreading hairs, the teeth subulate, ca. 2-3 mm long. Corolla violet. Standard ca. 22 mm long, the limb rhomboid, ca. 8 mm broad. Wing-petals ca. 18 mm long, the limb elliptic, asymmetrically dentate at apex, at the base auriculate, auricle ca. 2 mm long. Keel ca. 15-16 long, the limb oblique-elliptic. Ovary pilose. Pods elliptic, ca. 10-12 mm long, ventrally carinate, dorsally applanate or slightly sulcate, recurved-rostrate at the apex, recurved, densely covered with long white lanate hairs mixed with short spreading hairs, fully bilocular.

Note: This species is transferred from section *Grammocalyx* to section *Malacothrix*. In young stages the calyx is inflated, but in fruiting time it is ruptured by the pod.

Specimens seen:

Esfahan: Chadegan, above Analogeh, Dalan-Kuh, 2650-3000 m, *Nowroozi 305* (TARI).

Hamadan: Ecbatan sad to Yalfan village, 2000 m, *Maassoumi 59333* (TARI).

17. *Astragalus lisaricus* Maassoumi sp. nov.

Holotypus: Azarbajejan: between Khalkhal and Ardebil, protected area of Lisar, 2500 m, 23.6.1989, *Maassoumi & Abouhamzeh 56940* (TARI; Iso.: Herb. Podl.).

Differt ab *A. becki* Bornm. foliis angusti-ellipticis (nec oblongi-ovatis), stipulis majoribus, ad basin petiolo brevissime adnatis (nec libris), floribus albis (nec intense violaceis), calyces minore, subinflato, dentibus ejus linearibus, Bracteis linearibus (nec ovatis).

Fig.: MAASSOUMI, A.A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 82 (habit, flower dissection).

Plantae acaules, ca. 10 cm altae. Stipulae lanceolatae acuminatae ca. 7 mm longae, albigiliosae, basi petiolo breviter adnatae inter se connatae. Folia ca. 4-5 cm longa, petiolo ca. 1,5-2 cm longo, sicut rachis dense subappresse albipiloso. Foliola 10-12 juga, angusti-elliptica, 6-7 mm longa et 2-3 mm lata, utrinque dense appresse pilosa. Inflorescentia solitaria, capitulo 6-15 floro formans. Bractea lanceolata, ca. 5-6 mm longae, dense patenter albi-nigri-pilosae. Calyx tubulosus ca. 11-12 mm longus, manifeste inflatus, paralleliter purpurescenti-nervosus, dense longe patenter albi-nigri-pilosus, dentibus linearibus, ca. 5 mm longis, nigripilosis. Corolla in vivo alba, in sicco pallide violacea. Vexillum ca. 20 mm longum, lamina rhomboida ca. 10 mm lata, apice leviter emarginata. Alae ca. 17 mm longae, lamina oblongi-elliptica, apicem versus attenuata, antice acuta, basi auriculata, auricula ca. 1,5 mm longa, ungue lamina longiore. Carina ca. 15 mm longa, lamina triangulare, ungue lamina duplo longiore. Ovarium pilosum. Legumen ca. 8-10 mm longum et 3-4 mm latum, ventro late carinatum, dorso rotundatum profunde sulcatum, dense albi-lanatum pilis brevissimis patentibus immixtis, complete biloculare. Semina 4.

7. *Astragalus patrius* group

Plants scapose, acaulescent. Bracts linear, covered with black and white spreading hairs. Calyx tubular. Flowers yellow. Standard elliptic. Pods stipitate, densely covered with long silky hairs.

Astragalus patrius.

18. *Astragalus patrius* Maassoumi in Iran. J. Bot. 4: 137. 1988. **Holotype:** ca. 30 km S of Ramsar, Shah-e Sefid Kuh, 3100-3400 m, 12.7.1984, *Assadi & Maassoumi 51297* (TARI).

Fig.: MAASSOUMI, A. A. 1993, Illustr. guide gen. Astrag. Iran 2: plate 87 (habit); pages 219 (indument of peduncle and pod) and 222 (flower dissection).

Plants acaulescent with divided stock. Stems prostrate at the surface of the soil, ca. 12-14 cm long. Stipules lanceolate ca. 5 cm long, covered with black and white appressed hairs, at the base shortly adnate to the petiole and shortly jointed to one another. Leaves ca. 8-10 cm long, petiole ca. 2-3 cm long, both petiole and rachis covered with subpatent white hairs. Leaflets 12-13 pairs, oblong or elliptic, ca. 8-9 mm long and 3-4 cm broad, round tipped, cuneate at the base, both sides covered with appressed hairs. Inflorescence terminal, spherical, with 7-9 flowers; peduncle ca. 10-13 cm long, in the lower part with white appressed hairs, in the upper part below the inflorescence mixed with black hairs. Bracts linear, ca. 5 mm long, covered with black and white spreading hairs. Calyx tubular, ca. 13 mm long, densely covered with black and white hairs. Corolla yellow. Standard ca. 18-19 mm long, the limb oblong-elliptic, emarginate at the apex, at the base near the claw constricted. Wing-petals ca. 16-17

mm long, the limb narrowly elliptic, round tipped, at the base shortly auriculate, auricle ca. 1 mm long, claw 1.5 times longer than the limb. Keel ca. 14 mm long, the limb elliptic, recurved at the acute apex, at the base auriculate, claw 1.5 times longer than the limb. Pod shortly stipitate, ovoid, ca. 9 mm long and 5 mm broad, ventrally rounded, dorsally sulcate, rostrate at apex, covered with long silky hairs, fully bilocular. Seeds 2, reniform, ca. 3 mm long, brown.

Specimens seen:

Mazandaran: ca. 30 km S of Ramsar Shah-e Sefid Kuh, 3100-3400 m, 12.7.1984, *Assadi & Maassoumi 51297* (TARI).

Zanjan: Toward Mahnesan, Nopa, 1750-200m, 22.6.1983, *41085* (EVIN).

8. *Astragalus plebejus* group

Small herbs, acaulescent or with very short stem. Bracts subulate. Calyx campanulate, the teeth setaceous as long as or shorter than the tube. Pods ovaloid.

Astragalus plebejus, *A. babakhanloui*, *A. chahartaghensis*.

19. *Astragalus plebejus* Boiss., Diagn. Pl. Or. Nov. 6: 37 (1845). Type: Persias austro-occid., Kuh-Delu, 11.6.1842, *Th. Kotschy 485* (FI! W!).

Fig.: MAASSOUMI, A. A. 1990, *Illustr. guide gen. Astrag.* Iran 1: plate 90 (habit); - pages 218 (indument of peduncle and pods) and 222 (flower dissection).

Plants acaulescent, ca. 3-6 (-12) cm tall. Stipules acuminate, hairy, ca. 2 mm long. Leaves 2-4 (-6) long, petiole ca. 2-3 cm long, both petiole and rachis covered with short spreading hairs. Leaflets 7-10 pairs, complicate, elliptic, 6-8 mm long and 2-3 mm broad, densely hairy on both sides. Inflorescence a spike with numerous flowers; peduncle ca. 2-3 (-9) cm long, covered with spreading hairs. Bracts very short, ca. 1 mm long, pilose. Calyx tubulose, ca. 10 mm long, covered with black and white spreading hairs, the teeth setaceous, ca. 4-5 mm long. Corolla violet. Standard ca. 10-11 mm, the limb elliptic, retuse at apex or emarginate. Wing-petals ca. 9 mm long. Keel ca. 8 mm long. Ovary pilose, sessile. Pods unknown.

Notes: This species differs from *A. melanodon* Boiss. by its setaceous calyx teeth which are as long as the tube (nut much shorter).

Specimens seen:

Esfahan: Borujen, Kohyan, Bakhtiari, 1700 m, 17.5.1983, *Nowroozi 2529* (Esf.); Esfahan to Shar-e Kurs. Gardaneh Rokh, 2100-2200 m, *Nowroozi 2404* (Esf.)

Bakhtiari: N. slopes of Kuh-e Kallar, S. of Sibak, 2500-3200 m, 4.7.1986, *Mozaffarian 57394* (TARI).

Fars: 128 km, Abadeh road, 1800 m, *Riazi 9108* (TARI).

20. *Astragalus babakhanloui* Maassoumi & Podlech in Iran. J. Bot. 4: 72. 1988. Holotype: Lorestan, 55 km from Arak to Malayer (VT3), 2100 m, 15.6.1984, *Mozaffarian & Maassoumi 48083* (TARI!; Iso: Herb. PODLECH!).

Fig.: MAASSOUMI, A. A. & PODLECH, l.c.: 73 (habit); MAASSOUMI, A.A., 1990, Illustr. guide gen. Astrag. Iran 1: plate 80 (habit); - pages 219 (indument of peduncle and pods) and 222 (flower dissection).

Plants shortly caulescent, 5-15 cm tall, vested with appressed white hairs. Stems 1-5 cm long. Stipules membranaceous, the lower ones ca. 2 mm long, pilose, shortly jointed to one another, the upper ones lanceolate-triangular, densely pilose, lengthwise more united to one another. Leaves 4-6 cm long, petiole equaling the limb, covered with appressed hairs. Leaflets 3-6 pairs, narrowly elliptic, 7-14 mm long and 3-5 mm broad, round tipped, cuneate at the base, both sides vested with appressed hairs. Inflorescence axillar, capitate at first and elongated in fruit, up to 5 cm long; peduncle ca. 2-5 cm long, commonly covered with appressed or subpatent hairs. Bract narrowly ovate, ca. 2 mm long, with white hairs or sometimes mixed with predominately black hairs. Pedicel very short. Calyx 9-12 mm long, tubular, covered with scattered subpatent hairs, the teeth subulate, slightly longer than the tube. Corolla yellow. Standard 12-13 mm long, the limb elliptic, ca. 5 mm broad, emarginate at apex, cuneate at the base. Wing-petals 10-11 mm long, the limb oblong, rounded at apex, at the base auriculate, equaling the claw. Keel 8-9 mm long, the limb elliptic-triangular, acuminate at apex, 1-5 times shorter than the claw. Pods ovoid, pilose, ca. 7 mm long, 4 mm high and 3.5 mm broad, ventrally carinate, dorsally sulcate, fully bilocular. Seeds 2, ca. 4 mm long.

Specimens seen:

Chaharmahal-e Bakhtiari: Borojen, Boldaji, Kalbibak (Foot mt. of Kallar) 2250 m, 3.7.1986, *Mozaffarian 57386* (TARI); Lordegan Doushalvari, Khong-e Baraftab, 1680 m, 14.5.1987 *Mozaffarian 5990* (TARI); ca. 5 km from Lordegan to Ganduman Park-e Jangali-e Doushalvari, 1640 m, 29.5.1986, *Mozaffarian 54648* (TARI); Semirom, Hana, Chesmeh Khoni 2250 m, 18.9.1985, *Nowroozi 4004* (Esf.)

Fars: 27 km from Nurabad to Korekan, Doshman-ziary region, 2000 m, 31.5.1983, *Mozaffarian 45754* (TARI).

21. *Astragalus chahartaghensis* Maassoumi & Podlech in Mitt. Bot. Staats. München 29: 511. 1990. **Holotype:** Chaharmahal-e Bakhtiari, Sabz-kuh, Ghahartagh, 2350 m, 16.5.1987, *Mozaffarian 59968* (TARI!; Iso: Herb. PODLECH!).

Fig.: MASSOUMI, A. A. 1992, Illustr. guide gen. Astrag. Iran 2: plate 63 (habit); - page 219 (indument of peduncle and pods) and 222 (flower dissection).

Plants ca. 3-7 cm tall, with short stem ca. 1-3 cm long. Stipules acuminate, pilose, ca. 4-5 mm long, at a length of 1-2 mm adnate to the petiole. Leaves 5-8 cm long with short petiole, ca. 2-4 cm long, both petiole and rachis covered with spreading hairs. Leaflets (2-) 3-4 pairs, elliptic or obovate, 10-20 mm long and 3-6 mm broad, both sides densely covered with appressed white hairs. Inflorescence a dense spike with numerous flowers: peduncle ca. 2-3 cm long, densely covered with short spreading hairs. Bracts short, ca. 2-2.5 mm long, narrowly ovate, pilose. Calyx tubular, 9-12 mm long, covered with spreading white hairs or rarely mixed with some scattered black hairs, the teeth subulate ca. 5-6 mm long. Corolla violet or yellow but later changed to violet. Standard ca. 12 mm long, the limb elliptic, retuse at apex or emarginate, gradually attenuated at the base. Wing-petals ca. 10 mm long, the limb elliptic, dilated toward the apex, shorter than the claw. Keel ca. 9 mm long, the limb oblique-elliptic, shorter than the claw. Ovary pilose, sessile. Pods unknown.

Specimens seen:

Esfahan: Esfahan to Daran, Ghahis protected area, 2500 m, *Nowroozi 342* (Esf.).

Fars: 15 km N. Shiraz, 1750 m, 28.4.1961, *Pabot 6090* (28581) (TARI).

Bakhtiari: Sabz-Kuh, Chahartang, 2350 m, 16.5.1987, *Mozaffarian 59968* (TARI); Shahr-e Kord, Baba-Heidart, 2150-2500 m, 1.6.1986, *Mozaffarian 54809* (TARI); Brojen, Research Institute protection Station, 2200 m, 13.5.1987, *Mozaffarian 59868* (TARI); Ganduman, Kuh-e Baraftab, 2300 m, 31.5.1986, *Mozaffarian 54777* (TARI).

9. Astragalus hirtus group

Plants acaulescent, densely covered with long bristle-like hairs or strigose. Leaflets narrowly elliptic, complicate, upper side glabrous, lower side densely covered with long bristle-like hairs, inserted in little tubercle.

Astragalus hirtus, *A. capillatus*.

22. Astragalus hirtus Bunge in Mém. Acad. Imp. Sci. Saint-Petersbourg, 11 (16): 54. 1868 in clave et l.c. 15 (1): 87. 1869. **Type:** Persia, inter Gäs et Murtschehar, N Isfahan, Mai 1859, *Bunge & Bienert* (P!).

Plants acaulescent, ca. 7-8 cm tall, densely covered with long bristle-like hairs or strigose. Stipules lanceolate acuminate, ca. 7-8 mm long, subglabrous or with some scattered short hairs on the outside and ciliate at the margin, at a length of 2-2,5 mm adnate to the petiole and jointed to one another. Leaves ca. 6-7,5 cm long, petiole ca. 2 cm long, both petiole and rachis covered with rigid hairs 4-4,5 mm long. Leaflets ca. 8 pairs, oblong or narrowly elliptic, complicate, remote, 10-12 mm long and 3-4 mm broad, upper side glabrous or with very few isolated hairs toward the margin, lower side densely covered with distinctly tuberculated hairs. Inflorescence (young stage) spherical; peduncle ca. 1-1,5 cm long, densely hirsute. Bracts lanceolate, ca. 4-5 mm long, hirsute. Calyx ca. 8 mm long, hirsute, the teeth ca. 1,5 mm long. Rest of flower and pods unknown.

Notes: This curious species described in sect. *Stereothrix* has been examined by the author on the type specimen. Length of calyx teeth, the shape of inflorescence and the remote leaflets do not show any affinity with the species of sect. *Stereothrix*. In my opinion the best position of this interesting species seems to be within sect. *Malacothrix* Bge.

23. Astragalus capillatus Maassoumi sp. nov.

Holotypus: Chaharmahal-e Bakhtiari: Shahr-e Kord, Shalamzar, Agha-Sabz, 28.5.1986, 2400 m, *Mozaffarian 54615* (TARI).

Fig.: MAASSOUMI, A.A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 62 (habit); -pages 221 (indument of peduncle and pods) and 222 (flower dissection).

A species which is distinguishable from its nearest relative *A. hirtus* Bunge by its short stem, covered with long rigid hairs.

Planta perennis, acaulis, ca. 10-14 cm alta, caudex multiceps. Stipulae lanceolatae, acuminatae, ca. 8-10 mm longae, albi-nigri-pilosae, basi per 2-3 mm petiolo adnatae, inter se

connatae. Folia ca. 7-10 cm longa, petiolo ca. 2 cm longo, sicut rachis dense longe albi-piloso. Foliola ca. 8-9 juga, anguste elliptica, ca. 8 mm longa et 3 mm lata, antice obtusa, utrinque patenter pilosa. Inflorescentia solitaria, racemo dense multifloro. Bractee lineares, ca. 8 mm longae, albi-nigri-pilosae. Calyx tubulosus, ca. 15 mm longus, basi manifeste inflatus, longe albi- et brevissime nigri- pilosus, dentibus setaceis ca. 6 mm longis. Corolla flava, deinde intense violacea. Vexillum ca. 17 mm longum, lamina anguste rhomboidea, apice rotundata vel leviter emarginata. Alae ca. 15 mm longae, lamina oblongi-elliptica, antice rotundata, basi auriculata, auricula ca. 1,5 mm longa. Carina ca. 14 mm longa, lamina oblique elliptica, ungue lamina sesquolongiore. Ovarium pilosum, breviter stipitatum. Legumen ignotum.

10. *Astragalus iranicus* group

Plants acaulescent, covered with spreading hairs. Inflorescence cylindrical. Calyx tubular, the teeth subulate. Flowers yellow. Standard obovate. Pods ovate, densely lanate, mixed with short spreading hairs.

Astragalus iranicus, *A. ghootapacensis*, *A. perdurabilis*.

24. *Astragalus iranicus* Bunge in Mém. Acad. Imp. Sci. Saint Petersburg 11 (16): 6. 1868 in (1872). **Syntypes:** prope Scharud V.1868, *Bunge & Bienert* (FI!, K!); pr. Sof, Tehran, *Bunge & Bienert*; prope Asadbar et Paskaleh, *Kotschy 297* (W!).

= *A. griseus* Boiss. var. *viridis* Parsa, Fl. Iran 9: 36. 1966. **Typus:** W. Golpayegan, 4.5.1957, *Parsa* ? (K) non vidi.

= *A. ahouicus* Parsa, Fl. Iran 9: 33. 1966. **Typus:** W. Golpayegan, 4.5.1957, *Parsa* ? (K) non vidi.

= *A. chrysotrichus* Boiss. f. *lineatus* Parsa, Fl. Iran 9: 36. 1966. **Typus:** N.W. Azarbajejan, Khalkhal, 16.7.1956, *Parsa* ? (K) non vidi.

Fig.: MAASSOUMI, A.A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 75 (habit); - page 222 (flower dissection).

Plants ca. 10-25 cm tall, acaulescent or with a short stem up to 5 cm long. Stipules ca. 8-10 mm long, lanceolate, covered with white hairs or mixed with black hairs, at a length of ca. 4 mm adnate to the petiole. Leaves ca. 7-12 cm long, petiole ca. 3-4.5 cm long, both petiole and rachis covered with long scattered hairs, mixed densely with short spreading hairs. Leaflets 11-13 pairs, oblong or elliptic, ca. 8-12 mm long and 3-5 mm broad, both sides covered with appressed hairs. Inflorescence a spike with numerous flowers, at first conical, then elongating, becoming cylindrical in fruit; peduncle ca. 5-11 cm long, covered with long scattered hairs and fine short spreading hairs. Pedicel nearly absent. Calyx ca. 12-13 mm, covered with white hairs or mixed with black hairs at the teeth, the teeth ca. 4 mm long. Corolla yellow. Standard ca. 22 mm long, the limb obovate elliptic. Wing-petals ca. 20 mm long, the limb elliptic, round tipped, at the base auriculate, claw ca. 1.5 times longer than the limb. Keel ca. 18 mm long, the limb oblique-elliptic or slightly curved, 1/2 times shorter than the claw. Pods sessile or shortly stipitate, ovoid, ca. 11 mm long and 4 mm broad, at the apex shortly acuminate, terminating in a beak, ventrally carinate, dorsally sulcate, covered with long, soft, white hairs mixed with short spreading hairs, fully bilocular. Seeds 4.

Notes: Analysis on the type material showing the obovate-elliptic standard limb (not rhomboid) make this species easily separable from *A. mollis* M.Bieb., with which it was combined in former times.

Specimens seen:

Tehran: On the road to Karadj, in Botanic Garden, 1320 m, 20.6.1974, *Mansur Moaied & Amini 12570* (TARI); Vardavard valley, 1800 m, 27.5.1974, *Wendelbo, Sanii & Assadi 11471* (TARI); Mountains N.W. of Tehran, Sulughum valley, 1600 m, 1.5.1979, *Assadi, Mozaffarian & Nowroozi 33676* (TARI); Between Tehran and Karaj, Kuh-e Garm-darreh, 1700 m, 8.5.1979, *Assadi, Mozaffarian & Nowroozi 3357* (TARI); Mountains E of Karadj, 1700 m, 23.5.1979, *Assadi et al 32597* (TARI); Karadj, above Valian, 2000 m, 16.5.1978, *M. Assadi et al 32547* (TARI); W of Tehran, Sulughun valley, 1500-2000 m, *M. Assadi & V. Mozaffarian, 31.6.1979* (TARI); Chitgar, 1350 m, 24.5.1972, *M. Riazi 6127* (TARI); Arak to Mahallat, late-dar, Mate-dar Mts., 2100-2500 m, 14.6.1984, *Mozaffarian & Maassoumi 47963, 47961* (TARI); Between Arak and Khomein, arche village, 2050 m, 15.6.1984, *Mozaffarian & Maassoumi 48020* (TARI); Sorkhe-Hesar, Haraz road, 1530 m, 3.6.1974, *Foroughi, Sanii, Moayed & Amini 12470* (TARI); 15 km W d'Arak, 2050 m, 7.6.1959, *H. Pabot 1199 (28551)* (TARI); Homand, 29.5.1965, *H. Pabot 28554* (Tari); Ibid. 29.5.1966, *Pabot 31106* (TARI); Northern part of Tehran, 1200 m, 7.5.1961, *Zohary & Orshan 14* (HJ).

Khorassan: N slope of Torbat-e Sefid, 1700-2000 m, 29.5.1977, *Runemark & Sardabi 23802* (TARI).

Fars: Cahar dongeh, 22.5.1965, *Ledingham & Asefi 23685* (Tehran University)

Azarbayejan: 6 km Mianeh, 1000 m, 19.5.1960, *H. Pabot 3328 (28558)* (TARI); 15 km from Zanjan on the road to Bijar, 1900, 30.5.1974, *Wendelbo, Assadi & Shirdelphur 11873, 11853* (TARI); 50-60 km to Zanjan from Mianeh, 1200 m, 1.6.1978, *Wendelbo & Assadi 28041* (TARI).

25. *Astragalus ghoortapacensis* Maassoumi in Mitt. Bot. Staats. München 29: 504. 1990.

Holotype: Esfahan, Semiron, Ghoortapacy, 2500 m, 14.6.1986, *M. Nowroozi 4307* (TARI).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 68* (habit); - page 221 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent, ca. 12-14 cm tall. Stipules triangular, ca. 2-3 mm long, pilose, at the base shortly adnate to the petiole and jointed to one another. Leaves 6-8 cm, petiole ca. 1,5-2 cm long, both petiole and rachis covered with black and white appressed hairs. Leaflets 13-15 pairs, ovate or oblong, rounded at the tip or emarginate, both sides with appressed hairs. Inflorescence capitate, ovoid or cylindrical, flowers numerous. Bracts subulate, ca. 3-5 mm long, covered with black and white hairs. Calyx tubular, ca. 15 mm long, with some parallel purplish veins, densely covered with black and white spreading hairs, the teeth linear, ca. 3-4 mm long. Corolla yellow. Standard unknown. Wing-petals 20 mm long, the limb oblong-elliptic, asymmetrically notched at the tip, at the base auriculate, auricle ca. 1 mm long. Keel 16 mm long, the limb oblique-elliptic, curvate. Ovary pilose, stipitate. Pods with a stipe ca. 1 mm long, ovoid or ellipsoid, ca. 15 mm long and 5 mm broad, at the apex rostrate, ventrally rounded and slightly carinate, dorsally rounded, sulcate, densely lanate, mixed with short hairs, fully bilocular.

Specimen seen:

Esfahan: Semiron, Ghoortapacy, 2500 m, 14.6.1986, *M. Nowroozi 4307* (TARI).

26. *Astragalus perdurabilis* Maassoumi sp. nov.

Holotypus: **Gorgan:** Shah-Passand to Shahroud, south side of Pass Gardaneh Kosh-Yeilagh, 1800 m, 22.6.1974, *Wendelbo & Foroughi 12872* (TARI; Iso: Herb. PODLECH).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 89 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).

Differs from *A. iranicus* Bge. by the many-flowered cylindric inflorescences, the calyx ca. 16-17 mm long, shortly inflated, (not 12-13 mm long, tubular) and the setaceous calyx teeth, 6-7 mm long (not 3-4 mm).

Plantae perennes, acaules, ca. 12-13 (-17) cm alta. Stipulae lanceolatae ca. 7-8 mm longae, dense albi-pilosae, basi per 3-4 mm petiolo adnatae, inter se connatae. Folia ca. 9-12 cm longa, petiolo ca. 2 cm longo, sicute rachis dense longe et brevissime patenter albi-piloso. Foliola ca. 10-12 juga, oblonge elliptica, ca. 11 mm longa et 5-6 mm lata, complicata, utrinque subappresse vel patenter pilosa. Inflorescentia solitaris, multiflora, dense cylindrica vel elongati-capitata, pedunculo 4-7 cm longo, dense longe et brevissime patenter albi-pilosa. Bractee lineares, ca. 5 mm longae, albi-pilosae. Calyx tubulosus, basi manifeste inflatus, ca. 17 mm longus, albi-pilosus, dentibus setaceis, ca. 6-7 mm longis. Corolla flava, deinde violacea. Vexillum 19 mm longum, lamina obovata vel elliptica, antice retusa, in medio breviter constricta. Alae ca. 17 mm longae, lamina elliptica, ca. 7 mm longa, antice rotundata, basi auriculata, auricula ca. 1 mm longa, ungue lamina sesquilingiore. Carina 16 mm longa, elliptica, curvata, antice acuta, ungue lamina longiore. Ovarium pilosum, stipitatum. Legumen stipite ca 1 mm longo suffultum, ovoideum, ca. 9 mm longum et 4 mm altum, apice rostratum, rostro curvato, ventro rotundati-carinatum, dorso rotundati-sulcatum, dense lanatum pilis brevissimis albis patentibus immixtis, complete biloculare, oligospermum.

Other specimens seen:

Semnan: Shahrud, Chehheldokhtar, 1850 m, *Riazi 6134* (TARI).

Khorasan: Neishabour, Delbaran, 1400 m, *Foroughi 5872* (TARI).

11. *Astragalus glochidiatus* group

Plants acaulescent, leaflets linear. Inflorescence densely capitate. Standard limb ovate-oblong. Bracts linear.

Astragalus glochidiatus

27. *Astragalus glochidiatus* Maassoumi in Iran. *J. Bot.* 5: 13. 1991. **Holotype:** Kordestan, Bijar, Kuh-e Hamzeh-Arab, 2000-2600 m, 1.7.1971, *Termeh* (s.n.) (Evin!; Iso: W!).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran. 2*: plate 67 (habit); - pages 219 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent, ca. 10 cm tall. Stipules lanceolate, acuminate, ca. 12 mm long, glabrous to ciliate at the margin, at a length of ca. 5 mm adnate to the petiole and jointed to one another. Leaves ca. 7-8 cm long, petiole ca. 3-3,5 cm long, both petiole and rachis glabrous or rarely covered with short hairs. Leaflets ca. 5-6 pairs, linear-lanceolate, complicate, ca. 15 mm long and 2 mm broad, both sides covered with appressed hairs. Inflorescence solitary with numerous flowers in a dense head; peduncle ca. 6-9 cm long, glabrous or with some scattered, spreading hairs. Bracts lanceolate, ca. 5-7 mm long, covered with black and white hairs. Calyx tubular, ca. 12-14 mm long, with black and white hairs. Corolla yellow, changing to violet. Standard ca. 20 mm long, the limb ovate-oblong, retuse at the apex, at the base constricted into a claw. Wing-petals ca. 18 mm long, the limb narrowly elliptic, rounded at the apex, at the base auriculate, auricle ca. 1 mm long, the limb 1/2 length of the claw. Keel ca. 16 mm long,

the limb triangular-curved, acute at the tip. 1/2 length of the claw. Ovary pilose, shortly stipitate. Pods elliptic, ca. 12 mm long and 4-5 mm broad, ventrally rounded and slightly carinate, dorsally deeply sulcate, densely white lanate, fully bilocular.

Specimen seen:

Kordestan: Bidjar, Kuh-e Hamzeh-Arab, 2000-2600 m, 1.7.1971, *Termeh s.n.* (EVIN, W).

12. Astragalus mollis group

Plants acaulescent or shortly caulescent. Leaflets glabrous above or with some scattered hairs, with lower side densely appressed-hairy. Flowers yellow or violet.

Astragalus mollis, *A. memnonius*, *A. typhaeformis*, *A. takhtadzhani*, *A. khajiboulaghensis*, *A. belgheisicus*, *A. leucothrichus*, *A. alamouticus*, *A. pseudoantilibanii*, *A. birangae*, *A. suluklensis*.

28. *Astragalus mollis* M.Bieb., Fl. Taur.-Cauc. 3: 495. 1819 ≡ *A. eriocarpus* M.Bieb., Fl. Taur.-Cauc. 2: 196. 1808 non DC. **Type:** Iberia, circa Tiflin, *Steven* (W!).
= *A. comosus* Bunge in Mém. Acad. Imp. Sci. Saint Petersburg 11 (16): 55. 1868 in clave etl.c. 15 (1): 93. 1869. **Syntypes:** Persia, in alpinis prope Ask, ad radices Demavand, *Th.Kotschy 852* (W!); Urmia, *Szovits* (non vidi).

Fig.: MAASSOUMI, A.A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 85 (habit); - pages 218 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent, ca. 19 cm tall. Stipules lanceolate acuminate, ca. 4-8 mm long, densely appressed hairy, with some parallel veins, at the length of 2-3 mm adnate to the petiole and jointed to one another. Leaves ca. (6-) 10-17 cm long, petiole ca. (2-) 3-6 cm long, both petiole and rachis covered with short appressed hairs mixed with some isolated long hairs. Leaflets ca. 10-13 pairs, oblong-elliptic, ca. 6-15 mm long and 3-7 mm broad, upper side glabrous or with some scattered long hairs toward the margin, lower side densely covered with long appressed hairs. Inflorescence axillary, oblong or elliptic: peduncle ca. 7-11 cm long, sulcate, covered with short appressed hairs or mixed with some isolated long hairs. Bracts linear-lanceolate, ca. 4-6 mm long, with black and white hairs. Calyx tubular, ca. 10-12 mm long, covered with black and white hairs, the teeth subulate ca. 3-4 mm long. Corolla yellow. Standard ca. 20-24 mm long, the limb rhomboid, ca. 7-10 mm broad, emarginate at apex. Wing-petals ca. 17-22 mm long, the limb elliptic, dilated toward the apex, at the base auriculate, auricle ca. 2 mm long, the limb equaling the claw. Keel ca. 15-20 mm long, the limb narrowly elliptic, curved toward apex. Ovary pilose, shortly stipitate. Pods ellipsoid, ca. 12-13 mm long and 5-6 mm broad, at apex with a recurved, ca. 4 mm long beak, ventrally slightly carinate, dorsally deeply sulcate, densely covered with long hairs, mixed with short spreading hairs, fully bilocular.

Specimens seen:

Azərbaycan: Inter Marand at Sufian, 1600-1750 m, *Rechinger 41275* (W); 13 km S. of Mianeh, 970 m, 19.5.1960, *Pabot s.n.* (TARI); Ardebil, Sabalan mts., Shabil region, 2400-2700 m, 24.6.1986, *Maassoumi & Abouhamzeh 56957* (TARI).

Kordestan: Salwat-Abad pass, SE of Sanandaj, 1480-1950 m, 7.5.1989, *Fattahi & Khaledian 1057* (TARI).

Tehran: Enter Gach-i Sar et Chalus, 3000 m, 18.5.1956, *Schmid 5772* (TARI); N of Sad-e latyan, 1800 m, 16.5.1973, *Arazm & Bazargan 15009* (TARI); 5 km N of Karaj, *Ledigham 4066* (TARI); In mont Pic kuh, *Rechinger 59054* (W); Arak, Khan-e Miran, Sefid Khany mt., 2100-2300 m, *Mozaffarian & Maassoumi 47794* (TARI); Djadjroud, 1700 m, *Arazm & Bazargan 15644* (TARI); Karaje, above Valian, 2000 m, *Assadi & al. 33378* (TARI); Chalus road, before Adarna, 1900 m, 13.5.1985, *Khatamsaz, Maassoumi & Abouhamzeh 52107* (TARI); Karaj valley, Sirachal, 1850 m, 23.5.1974, *Wendelbo & Shirdelpur 11637* (TARI); Between Arak and Khomain, Varche, 2600 m, *Mozaffarian & Maassoumi 48060* (TARI).

Hamadan: Avadj-Sultan-Bulagh, mts. 2000-2400 m, 12.5.1987, *Maassoumi & Mirhosseini 59391* (TARI).

Zanjan: 13 km S Mianeh, 1000 m, 19.5.1960, *Pabot 3370* (TARI); Zanjan to bijar, 1400 m, *Sabeti 15333* (TARI); from Zanjan to Mahneshan, 12 km after Andabad, 2200 m, *Maassoumi 64791* (TARI).

Mazandaran: Enter Amol et Siavicheh, 500-1100 m, 21.5.1956, *Schmid 5868*; Damavand area, 2100 m, 14.5.1959, *Wendelbo 720* (K); Haraz road, Ab-Garm, 2700 m, *Maassoumi 55132* (TARI).

29. *Astragalus memnonius* Maassoumi & Podlech in Iran. J. Bot. 4: 81. 1988. Holotype: Hamadan, Neiridj, near Avadje, 1600 m, 13.5.1974, *Dini & Bazargan 8572* (TARI!).

Fig.: MAASSOUMI, A.A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 84 (habit); - pages 220 (indument of peduncle and pods) and 224 (flower dissection).

Plants ca. 20-22 cm tall, covered with white hairs or with mixed black and white hairs. Caudex branched, stems ca. 4-6 cm long with short internodes, covered with white appressed hairs. Stipules ca. 3-5 mm long, membranous, covered with black and white hairs, at a length of ca. 1 mm adnate to the petiole and shortly jointed to one another. Leaves ca. 4-8 cm long, petiole 1-1.5 cm long, both petiole and the rachis covered with white hairs or mixed with black and white spreading hairs. Leaflets 10-15 pairs, oblong or obovate or obcordate, ca. 4-8 mm long and 2-4 mm broad, at the apex emarginate, upper side sparsely and lower side densely covered with soft appressed hairs. Inflorescence subterminal, a dense raceme ca. 3-8 cm long with numerous flowers; peduncle 6-8 mm long, with white subpatent hairs, below the spike mixed with black and white hairs. Bracts greenish, linear, ca. 6-10 mm long, pedicel nearly absent. Calyx 14-16 mm long, tubular and slightly inflated, covered with white hairs or mixed with black and white spreading hairs, the teeth subulate, ca. 4 mm long. Corolla pink greenish. Standard ca. 23 mm long, the limb rhomboid elliptic, at the apex shortly emarginate, at the base cuneate, near the claw shortly constricted. Wing-petals ca. 19 mm long, the limb oblong, round-tipped, at the base auriculate, auricle ca. 1-1.5 mm long, claw 1.5 times longer than the limb. Keel ca. 17 mm long, the limb oblong, recurved at the acute apex, at the base auriculate, claw 1.5 times longer than the limb. Ovary pilose, stipitate, stipe ca. 1 mm long. Pods unknown.

Specimen seen:

Hamadan: Neiridj near Avadje, 1600 m, 13.5.1974, *Dini & Bazargan 8572* (TARI).

30. *Astragalus typhaeiformis* Maassoumi in Iran. J. Bot. 4: 141. 1988. Holotype: Mazandaran: Lar Valley, 2450-2550 m, 2.7.1974, *Wendelbo & Assadi 13372* (TARI!).

Fig.: MAASSOUMI, A.A., 1988. l.c.: 142 (habit); 1990, Illustr., guide gen. Astrag. Iran 1: plate 94 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent or caulescent, up to 35–40 cm tall, stem up to 20 cm long. Stipule ovate, acuminate, ca. 5–7 mm long, at a length of 2–3 mm adnate to the petiole and jointed to one another, densely covered with black and white hairs. Leaves ca. 15–20 cm long, petiole 4–5 cm long, both petiole and rachis densely covered with spreading white hairs. Leaflets 18–20 pairs, elliptic or narrowly ovate, ca. 10–13 mm long and 3–4 mm broad, retuse tipped, at the base cuneate, upper side covered with scattered hairs toward the margin or glabrous, lower side vested with spreading hairs. Inflorescence axillary, a cylindric, dense spike, ca. 15 cm long; peduncle sulcate, ca. 15 cm long, covered with patent hairs or glabrous. Bracts linear, green, ca. 7–8 mm long, with black and white hairs. Calyx tubular, at the base slightly gibbous, ca. 14 mm long, covered with black and white hairs, the teeth subulate, ca. 4–5 mm long. Corolla initially yellow, then turning brownish. Standard ca. 21 mm long, the limb rhomboid, at the middle part ca. 9 mm broad, emarginately tipped or bilobate, at the base abruptly constricted. Wing-petals ca. 18 mm long, the limb elliptic, ca. 7 mm long, round-tipped, at the base auriculate, auricle ca. 1,5 mm long, 1/2 length of the claw. Keel ca. 17 mm long, the limb oblique elliptic, recurved, shorter than the claw. Ovary pilose, stipitate. Pods with a stipe ca. 1 mm long, oblong-oval or ellipsoid, ca. 11 mm long and 5 mm broad, terminating in a recurved beak, ventrally carinate, dorsally sulcate, densely covered with white long hairs mixed with short spreading hairs, fully bilocular. Seeds 4, reniform, ca. 3 mm long and 2,5 mm broad, alveolate.

Specimens seen:

Mazandaran: Lar valley, 2450–2550 m, *Wendelbo & Assadi 13254, 13323* (TARI); Lar valley, below Rudkhaneh Abru (Sefid Ab), 2300 m, *P. Wendelbo 11830* (TARI); Haraz road, E. of Polur, 7 km to Ab-Ask, 2100 m, 19.5.1988, *Runemark & Mozaffarian 28221* (TARI); Ibidem, 3.6.1976, *Maassoumi 55133* (TARI); Ibidem, *Babakhanlou & Amin 22060* (TARI).

Tehran: 35 km to Firouz-kuh on the road from Damavand, 2080 m, *Assadi & Mozaffarian 35313* (TARI).

31. *Astragalus takhtadzhani* Grossh. in Fl. USSR 12: 886. 1946. **Holotype:** in viciniis urb. Erevan prope pag. Dzhervesch, 12.5.1922, *A. Grossheim* (BAK) non vidi.

Fig.: MAASSOUMI, A.A., 1993, Illustr., guide gen. Astrag. Iran 2: plate 100 (habit); - pages 218 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent or with well developed stem, ca. 5–10 cm tall. Stipules ca. 8–10 mm long, covered with white hairs, acute, linear-lanceolate, at a length of ca. 2 mm adnate to the petiole. Leaves ca. 12–15 cm long, petiole 3–5 (–8) cm long, sulcate, both petiole and rachis covered with short appressed hairs or glabrous. Leaflets 14–16 pairs, elliptic, ca. 12 mm long and 4 mm broad, upper side glabrous and lower side with some isolated hairs or glabrous. Inflorescence a dense spike with numerous flowers; peduncle ca. 5–10 cm long. Pedicel nearly absent. Bracts linear, ca. 15–20 mm long, covered with black and white hairs. Calyx tubular, ca. 15–16 mm long, covered with black and white hairs, the teeth setaceous, ca. 4–5 mm long. Corolla yellow. Standard ca. 24 mm long, the limb rhomboid, ca. 9 mm broad, towards the apex ligulately attenuate, incised, at the base near the claw constricted. Wing-petals ca. 21 mm long, the limb narrowly elliptic, round-tipped, at the base auriculate, claw equaling the limb or slightly longer. Keel ca. 19 mm long, the limb oblique-elliptic, claw two times longer than the limb. Ovary pilose, sessile. Pods sessile, ovoid, ca. 12 mm long and 4 mm broad, at the apex ending in a beak, covered with long silky white hairs, bilocular.

Specimens seen:

Azarbayejan: Jolfa, 18 km, Marand road, 1190 m, 12.6.1972, *Foroughi 6285* (TARI); 27 km from Khalkhal to Kivi, 1500-1650 m, 16.6.1980, *Mozaffarian & Nowroozi 34174* (TARI); 19 km from Khalkhal to Kivi, Anavis village, 1680 m, 16.6.1980, *Mozaffarian & Nowroozi 36164* (TARI); 13-18 km SE Mianch, 1200 m, 6.5.1971, *Rechinger 39354* (W).

- 32. *Astragalus khajiboulaghensis*** Maassoumi in Mitt. Bot. Staatssamml. München, 29: 505. Aje-Boulagh, 1950 m, 21.6.1980, *Mozaffarian & Nowroozi 34683* (TARI!).

Fig.: MAASSOUMI, A.A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 77 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent, ca. 5-9 cm tall with a divided caudex. Stipules ca. 3-4 mm long, ovate, pilose, at a length of ca. 1 mm adnate to the petiole and jointed to one another. Leaves 3-5 cm long, petiole ca. 0,5-1,5 cm, both petiole and rachis covered with long and short white spreading hairs. Leaflets ca. 15 pairs, narrowly elliptic, ca. 4 mm long and 1-2 mm broad, rounded, upper side glabrous, lower side covered with subappressed hairs. Inflorescence axillary, flowers numerous in dense head, elongating in fruit; peduncle ca. 3-3.5 cm long, covered with subappressed hairs, toward the inflorescence mixed with black hairs. Bracts linear-lanceolate, ca. 8-9 mm long, with black and white hairs. Flowers nearly sessile. Calyx tubular, ca. 15 mm long, densely covered with black and white hairs, the teeth linear, ca. 5-7 mm long. Corolla yellow. Standard ca. 19 mm long, the limb narrowly rhomboid, ca. 6 mm broad, at the apex emarginate. Wing-petals ca. 16 mm long, the limb narrowly elliptic, rounded at the apex, at the base auriculate, auricle rounded, ca. 1,5 mm long, the claw 2 times longer than the limb. Keel ca. 15 mm long, the limb oblique-elliptic, rounded at the apex, nearly equaling the claw. Ovary pilose. Pods shortly stipitate, ovoid, ca. 10 mm long and 4-5 mm broad, rostrate-tipped, ventrally rounded, dorsally deeply sulcate, densely lanate, fully bilocular.

Specimen seen:

Azarbayejan: 60 km from Namin to Khaje-Boulagh, above Khaje-Boulagh, Aje-Boulagh, 1950 m, 21.6.1980, *Mozaffarian & Nowroozi 34683* (TARI).

- 33. *Astragalus belgheisicus*** Maassoumi in Iran. J. Bot. 5: 10. 1991. **Holotype:** Zanjan, Mahnesan, Anguran, Belgheis mts., 2700-2900 m, 29.5.1987, *Maassoumi 64843* (TARI!).

Fig.: MAASSOUMI 1993, Illustr. guide gen. Astrag. Iran 2: plate 58 (habit); - pages 219 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent, ca. 10-12 cm tall. Stipules triangular-lanceolate, pilose, ca. 4-5 mm long, at a length of ca. 1-1,5 mm adnate to the petiole and jointed to one another. Leaves ca. 7-8 cm long, petiole ca. 1,5-2 cm long, both petiole and rachis densely covered with spreading hairs. Leaflets ca. 12-13 pairs, oblong-elliptic, obtuse or retuse, ca. 8-10 mm long and 3-5 mm broad, upper side glabrous, lower side covered with subappressed hairs. Inflorescence capitate, ovoid, flowers numerous; peduncle ca. 5-7 cm long, covered with spreading hairs, toward the inflorescence mixed with black hairs. Bracts linear-lanceolate, ca. 7-8 mm long, densely covered with black and white hairs. Calyx tubular, inflated at the base, ca. 15 mm long, densely covered with white lanate hairs, mixed with short black hairs, the teeth linear, ca. 4-5 mm long.

Corolla yellow. Standard ca. 22 mm long, the limb rhomboid, ca. 9 mm broad, emarginate at the apex. Wing-petals ca. 18 mm long, the limb elliptic, at the apex rounded, at the base auriculate, auricle ca. 2 mm long, the limb nearly equaling the claw. Keel ca. 16 mm long, the limb triangular, curvate, the claw 2 times longer than the limb. Ovary pilose, sessile. Pods ca. 8 mm long, ca. 3-4 mm broad, densely lanate.

Specimens seen:

Zanjan: Mahneshan, Anguran, Belgheis mts. 2700-2900 m, 25.4.1987, Maassoumi 64842 (TARI); ca. 34 km from Gilvan to Zanjan, N slope of Alburz rangs, 1600 m, 6.5.1987, *Assadi & Shah-Mohammadi 60301* (TARI).

Hamadan: Avadje, Sultan-Bulagh mts. 2000-2400 m, 12.5.1987, *Maassoumi & Mirhosseini 59394* (TARI).

Azarbayejan: Khalkhal to Ardabil, 35 km Khalkhal, 1400-1700 m, 24.5.1974, *Termeh & Moussavi 16481* (Evin).

34. *Astragalus leucotrichus* Maassoumi sp. nov.

Holotypus: Kordestan: Elevations of Abbedar, 5 km from Sanandaj, 1750-1850 m, 9.5.1986, *Fattahi & Khaledian 1026* (TARI!).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 79* (habit); - pages 220 (indument of peduncle and pods) and 224 (flower dissection).

Differs from *A. galbineus* Maassoumi by the limb of wing-petals rounded at apex (not emarginate), upper side of the leaflets glabrous or with some subpatent hairs toward the margin only (not completely covered with appressed hairs); from *A. idoneus* Maassoumi & Podlech by much shorter calyx teeth, the peduncle covered with white subpatent and long black spreading hairs (not only with white appressed hairs); from *A. belgheisicus* Maassoumi by flowers dark violet (not yellow) and calyx teeth 2 mm long (not 5-6 mm).

Plantae perennes, breviter caulescentes, ca. 17 cm altae. Stipulae ovati-lanceolatae, inferiores appresse albi-pilosae, superiores nigri-pilosae, ca. 4-8 mm longae, basi per 2 mm petiolo adnatae, inter se connatae. Folia 9-11 cm longa, petiolo (1-) 2-4 cm longo, cum rachide dense pilis albis nigrisque subpatentibus aequilongis oblecto. Foliola ca. 15 juga, oblongi-elliptica, apice obtusa, 4-9 mm longa et 2-4 mm lata, supra glabra vel marginem versus pilosa, subtus dense subappresse pilosa. Inflorescentiae in axillis foliorum superiorum, pedunculo 7-10 cm longo, dense patule brevissime albi- et longe nigri-piloso. Bractae lanceolatae, ca. 7-9 mm longae, dense rigide nigri-pilosae. Calyx tubulosus, ca. 12-13 mm longus, albi-nigri-pilosus, dentibus subulatis, 2-3 mm longis. Corolla violacea (in sicco). Vexillum ca. 19 mm longum, lamina rhomboida, ca. 9 mm lata, antice emarginata vel biloba. Alae ca. 16 mm longae, lamina oblonga, apicem versus dilatata, antice rotundata, basi auriculata, auricula ca. 2 mm longa, ungue laminam aequantes. Carina ca. 15 mm longa, lamina elliptica. Ovarium pilosum. Legumen ignotum.

Other specimen seen:

Kordestan: Sanandaj, slope of Abidar, 1700 m, *Fattahi 2296* (TARI).

35. *Astragalus alamouticus* Maassoumi sp. nov.

Holotypus: Tehran, Ghazvin, Alamout, near the village Evan (VA4), 2000 m, 9.7.1984, *Assadi & Maassoumi 51047* (TARI!).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 56 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).

Differs from *A. idoneus* Maassoumi & Podlech by upper side of the leaflets glabrous (not hairy), standard limb rhomboid (not ovate-oblong) and by the pods covered with long hairs only (not mixed with short spreading hairs); from *A. leushanensis* Maassoumi by the rhomboid (not oblong-elliptic) standard.

Plantae perennes, ca. 5-11 cm altae, breviter caulescentes, caules ca. 1-1,5 cm longi, dense appresse vel subappresse albi-pilosi. Stipulae lanceolatae, ca. 3-5 mm longae, atripurpureae, appresse pilosae, per ca. 1 mm petiolo adnatae, inter se connatae. Folia ca. 3-6 cm longa, petiolo ca. 1-1,5 cm longo, sicut rachis pilis brevissimis appressis albis et longioribus appressis ad subpatentibus vel patentibus albis et nigris oblecto. Foliola 12-13 juga, oblongi-elliptica vel obovata, apice emarginata, 3-7 mm longa et 2-3 mm lata, supra glabra, margine sparse ciliata, subtus imprimis in costa mediana appresse pilosa. Inflorescentia solitaria, pedunculo 3-5 cm longo, sicut rachis piloso suffulta. Bractee lineares, ca. 12-15 mm longae, lineari-lanceolatae, subappresse albi-nigri-pilosae. Calyx tubulosus, leviter inflatus, ca. 12-13 mm longus, longe albi-hirsutus pilis brevissimis nigris immixtis, dentibus linearibus, ca. 4 mm longis. Corolla flava. Vexillum ca. 18 mm longum, lamina rhomboida, in medio ca. 5,5 mm lata, antice profunde emarginata vel biloba, basi in unguem abrupte contracta. Alae ca. 15 mm longae, lamina anguste elliptica, antice emargina, basi auriculata, ungue lamina paulo longiore. Carina ca. 14 mm longa, lamina elliptica, ungue lamina longiore. Ovarium pilosum, stipitatum. Legumen breviter stipitatum, ellipsoideum, ca. 9 mm longum et 3 mm latum, apice rostro ca. 3 mm longo, ventre carinatum, dorso breviter rotundatum et sulcatum, dense lanatum et insuper pilis brevibus patentibus albis oblectum, complete biloculare.

36. *Astragalus pseudoantilibani* Maassoumi sp.nov.

Holotypus: Azarbayejan: 14 km from Naim to Chulandarreh, Sofla to Germi, after Anbaran, 1600 m, 20.6.1980, *Mozaffarian & Nowroozi 34491* (TARI!).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 90 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).

Differs from *A. khajiboulaghensis* Maassoumi by the pods covered with long and short spreading hairs (not only with long hairs); from *A. antilibanus* Bunge by leaflets densely covered with appressed hairs on both sides (not glabrous on upper side) and petiole, rachis and peduncle covered with equal spreading hairs (not with a double indument).

Plantae perennes, acaules, caudex multiceps. Stipulae lanceolatae, ca. 10 mm longae, inferiores in facie glabrae, margine ciliatae, superiores appresse pilosae, basi per 2-3 mm petiolo adnatae, inter se connatae. Folia 11-5 cm longa, petiolo ca. 2,5 mm longo, sicut rachis dense brevissime patule piloso. Foliola ca. 13 juga, anguste elliptica, obtusa vel acuta, ca. 5 mm longa et 2-3 mm lata, utrinque dense appresse pilosa. Inflorescentiae multiflora, capitatae, pedunculo ca. 6-7 cm longo, brevissime patenter albi-piloso, infra capitulum sparse pilis nigris immixtis suffulto. Bractee lineares, ca. 6-7 mm longae, albi-nigri-pilosae. Calyx tubulosus, ca. 13-14 mm longus, albi-lanatus et insuper pilis nigris brevissimis patentibus oblectus, dentibus linearibus ca. 5 mm longis. Corolla flava. Vexillum ca. 22 mm longum, lamina rhomboida, ca. 8 mm lata, antice retusa vel leviter emarginata. Alae ca. 11 mm longae, lamina oblonga, antice

rotundata, basi auriculata, auricula ca. 2 mm longa, ungue laminam aequante. Carina ca. 17 mm longa, lamina elliptica recurvata, antice acuta, ungue lamina paulo longiore. Ovarium pilosum, breviter stipitatum. Legumen breviter stipitatum, ellipsoideum, ca. 12 mm longum et 4-5 mm latum, apice rostratum, rostro curvato ca. 2 mm longo, ventre late carinatum, dorso rotundatum et sulcatum, dense albi-lanatum et insuper pilis brevissimis patentibus obtectum, complete biloculare.

37. *Astragalus birangae* Maassoumi in Iran. J. Bot. 5: 10. 1991. **Holotype: Azarbayejan: Dasht-e Moghan, ca. 160 m, 15.4.1986, *Youssefy 24* (TARI!).**

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 59 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).*

Plants acaulescent, ca. 20-30 cm tall, or sometimes caulescent with stems up to 4 cm long. Stipules lanceolate, acuminate, greenish, ca. 7-8 mm long, covered with black and white hairs, at a length of ca. 3 mm adnate to the petiole and shortly jointed to one another. Leaves 20-30 cm long, petiole ca. 8-10 cm long, both petiole and rachis covered with white subappressed hairs. Leaflets ca. 14-15 pairs, the lower ones oblong or ovate-elliptic, the upper narrowly elliptic or linear, ca. (5-) 10-15 mm long and 3-5 mm broad, upper side glabrous or toward the margin with scattered hairs, lower side covered with appressed hairs. Inflorescence capitate with numerous flowers; peduncle ca. 2-2.5 cm long, covered with long spreading hairs mixed with short appressed hairs, toward the inflorescence mixed with black hairs. Bracts subulate or linear, ca. 6-8 mm long. Calyx tubular, ca. 15 mm long, covered with black and white hairs, the teeth linear, ca. 4 mm long. Corolla yellow. Standard ca. 26 mm long, the limb rhomboid, ca. 11 mm broad, emarginate at the apex or bilobed. Wing-petals ca. 23 mm long, the limb oblong, dilated toward the apex, at the tip rounded, at the base auriculate, auricle ca. 2,5 mm long. Keel ca. 23 mm long, the limb triangular, curvate. Ovary sessile, pilose. Pods unknown.

Specimen seen:

Azarbayejan: Dasht-e Moghan, ca. 160 m, 15.4.1986, *Youssefy 24* (TARI).

38. *Astragalus suluklensis* Freyn et Sint. in Bull. Herb. Boiss., ser. 2, 4: 451. 1904. **Holotype: Mts. Turkmenistan (Kopet-dagh), Suluklü village, 1.7.1900, *Sintenis 737* (non vidi).**

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 99 (habit); - pages 218 (indument of peduncle and pods) and 224 (flower dissection).*

Plants 20-35 cm tall, shortly caulescent, stems 3-6 cm long. Stipules lanceolate, 15-18 mm long, pilose, at the base adnate to the petiole. Leaves 10-20 cm, petiole and rachis densely covered with short, spreading, stiff hairs. Leaflets 10-14 pairs, elliptic or oblong, 7-15 mm long and 4-10 mm broad, upper side scattered and lower side densely hairy. Inflorescence a dense, long cylindrical spike, 5-12 cm long; peduncle 10-17 cm long with stiff spreading hairs. Calyx tubular, 18-22 mm long, covered with white hairs or mixed with black and white hairs. Corolla violet. Standard 20-24 mm long, the limb rhomboid, ligulate-attenuate toward the apex. Wing-petals 15-20 mm long, the limb elliptic, slightly dilated towards the apex. Keel shorter than the wings, 14-19 mm long, the limb oblique-elliptic. Ovary pilose. Pods sessile, ovoid, 7-11 mm long and 5-7 mm broad, ventrally carinate, dorsally sulcate, the apex with a curved beak 2-3 mm long, densely villous, bilocular.

Specimens seen:

Khorassan: 68 km on the road to Gifan from Bojnoord, after Amir-Abad, 1200 m, *Assadi & Maassoumi 50305, 50260* (TARI), ca. 25 km Sw of Darreh-Gaz, Tandooreh National Park, Chehel-Mehr, 1200 m, *Assadi & Maassoumi 50756* (TARI), ca. 30 km N of Shirvan, near Sevaldi, 1600 m, *Assadi & Maassoumi 50372* (TARI).

13. Astragalus canosus group

Plants acaulescent, whole plant densely villous. Corolla yellow. Standard rhomboid. Pods densely long-lanate.

Astragalus canosus.

39. Astragalus canosus Maassoumi in Iran. J. Bot. 5: 12. 1991. **Holotype:** Azarbayejan: Rezaiyeh, hill by the lake, just North of Golman-Khaneh, 1400 m, 1.6.1974, *Wendelbo, Assadi & Shirdelpur 11981* (TARI!).

Fig.: MAASSOUMI, A. A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 61 (habit); - pages 220 (indument of peduncle and pods) and 224 (flower dissection).

Plants ca. 15 cm tall, acaulescent or with short stems ca. 1-1,5 cm long, densely covered with lanate hairs, caudex divided. Stipules covered with black and white hairs, ca. 5-6 mm long, at a length of 3-4 mm adnate to the petiole, shortly jointed to one another. Leaves ca. 12 cm long, petiole ca. 3-4 cm long, both petiole and rachis densely covered with spreading white long hairs mixed with black hairs. Leaflets ca. 11-13 pairs, ovate-elliptic, both sides densely villous, ca. 7-9 mm long and 3-6 mm broad. Inflorescence capitata to ovate, flowers numerous; peduncle ca. 8-9 cm long, densely covered with long white and short black and white spreading hairs, toward the inflorescence merely with black hairs. Bracts linear, ca. 4 mm long, covered with black and white hairs. Calyx tubular, slightly inflated at the base, 12-13 mm long, covered with long white and short black hairs, the teeth linear, ca. 3 mm long. Corolla yellow. Standard ca. 18 mm long, the limb rhomboid, ca. 7 mm broad, retuse at the apex. Wing-petals ca. 15 mm long, the limb oblong, rounded at the apex, at the base auriculate, auricle ca. 1,5 mm long, the limb shorter than the claw. Keel ca. 11 mm long, the limb triangular. Pods ovoid ca. 12 mm long and 6 mm broad, densely lanate, at apex rostrate with a the beak ca. 4-5 mm long, ventrally carinate, dorsally sulcate, fully bilocular.

Specimens seen:

Azarbayejan: Rezaiyeh, hill be the lake, just north of Golman-Khaneh, 1400 m, 1.6.1974, *Wendelbo, Assadi & Shirdelpur 11981* (TARI).

14. Astragalus idoneus group

Plants acaulescent, glaucous. Petiole and rachis densely covered with very short, silvery, appressed hairs. Leaflets glabrous above, hairy along the mid-vein on lower side. Standard oblong-elliptic.

Astragalus idoneus, *A. leushanensis*, *A. inoblitus*, *A. caligineus*.

40. *Astragalus idoneus* Maassoumi & Podlech in Mitt. Bot. Staatss. München 29: 512. 1990.

Holotype: Tehran, Tehran to Karadj, Garm-Darreh, 2200 m, 7.5.1978, *Assadi 27540* (TARI!, Iso. Herb. PODLECH!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 71 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).*

Plants acaulescent, or shortly caulescent, stem up to 2 cm long, densely covered with short appressed hairs 0,3-0,8 mm long. Stipules membranous, triangular, ca. 2-6 mm long, covered with short, white, appressed hairs or mixed with few black hairs, at a length of 2-3 mm adnate to the petiole, shortly jointed to one another. Leaves 8-12 cm long, petiole ca. 1,5-4 cm long, both petiole and rachis covered with rigid appressed hairs. Leaflets 8-14 pairs, narrowly elliptic, ca. 5-8 mm long and 2-4 mm broad, rounded at the apex or slightly emarginate, upper side covered with scattered hairs, lower side covered more densely with appressed hairs, sometimes complicate. Inflorescence pedunculate with numerous flowers; peduncle ca. 4-8 cm long, at the base densely covered with short hairs, toward the apex mixed with scattered long white or black hairs. Bracts greenish, ca. 10-15 mm long, linear, covered with black and white hairs. Calyx ca. 14-16 mm long, tubular or slightly inflated, covered with long thin hairs, the teeth ca. 5-7 mm long. Corolla yellow, changing to violet. Standard 19-20 mm long, the limb elliptic, ca. 7-8 mm broad, shortly emarginate at the apex. Wing-petals ca. 17 mm long, the limb narrowly elliptic, dilated toward the apex, at the base auriculate, auricle ca. 1 mm long, the limb shorter than the claw. Keel ca. 16 mm long, the limb oblique-triangular-curved, ca. 6 mm long and 3 mm broad, the claw ca. 10 mm long. Ovary sessile, pilose. Pods sessile, densely covered with long patent hairs mixed with scattered short white hairs.

Specimen seen:

Tehran: Tehran to Karadj, Garm-Darreh, 2200 m, 7.5.1978, *Assadi 27540* (TARI).

41. *Astragalus leushanensis* Maassoumi sp. nov.

Holotypus: Gilan, 62 km to Rudbar on the road from Ghazvin, 1300 m, 3.5.1987, *Assadi & Shah-Mohammadi 60356* (TARI!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 80 (habit); - pages 220 (indument of peduncle and pods) and 224 (flower dissection).*

Differs from *A. idoneus* Maassoumi & Podlech by the calyx teeth ca. 3 mm long (not 6 mm) the peduncle densely covered with short appressed hairs only (not with mixed short and long hairs), the pods covered with long hairs only (not mixed with short spreading hairs); from *A. belgheisicus* Maassoumi by the peduncle with short appressed hairs (not with long and short hairs) and the obovate-oblong (not rhomboid) standard limb.

Plantae perennis, virides, brevissime caulescentes, caule ca. 3-5 cm longo, dense brevissime et longe albi-piloso. Stipulae lanceolatae, ca. 5 mm longae, dense brevissime appresse albi-nigri-pilosae, margine longe ciliatae, basi per 1,5-2 mm petiolo adnatae, inter se connatae. Folia 7-10 cm longa, petiolo 2-3,5 cm longo, cum rachide pilis subapressis albis, sparssime nigris immixtis obtecto. Foliola 13-14 juga, ovati-elliptica vel obovata, basi cunneata, apice retusa vel emarginata, ca. 6-8 mm longa et 2-4 mm lata, supra glabra vel marginem versus sparse pilosa,

subtus in costa mediana pilosa. Inflorescentia solitaris, primo capitata, deinde elongata, pedunculo ca. 5-6 cm longo, basi breviter appresse albi-piloso, capitulum versus albi-nigri-piloso suffulta. Bracteae ca. 8-9 mm longae, lineari-lanceolatae, patenter albi- et nigri-pilosae, margine longe ciliatae. Calyx tubulosus, breviter turgidus, ca. 14-15 mm longus, dense longe albi- et brevissime nigri-pilosus, dentibus linearibus, ca. 4-5 mm longis. Corolla flava (in vivo) demum purpurea. Vexillum ca. 19 mm longum, lamina elliptica, ca. 7 mm lata, antice emarginata. Alae ca. 18 mm longae, lamina anguste elliptica, antice rotundata, basi auriculata, auricula ca. 1 mm longa, ungue laminam aequante. Carina ca. 16 mm longa, lamina elliptica, ungue lamina paulo longiore. Ovarium pilosum. Legumen ignotum.

42. *Astragalus inoblitus* Maassoumi sp. nov.

Holotype: Azarbayejan, 19-20 km from Ahar to Tabriz, 1600-1700 m, 24.6.1986, *Maassoumi & Abouhamzeh 56963* (TARI!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 74 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).

Differs from *A. comosoides* D.F.Chamb. & V.A.Matthews by the oblong (not rhomboid) standard limb and the much longer calyx teeth; from *A. macrourus* Fisch. & C.A.Mey. by the much shorter inflorescence and the oblong, toward the apex attenuate (but not ligulate) standard limb and the shortly stipitate pods.

Plantae perennes, acaules, ca. 7-13 cm altae, caudex multiceps. Stipulae lanceolatae, acuminatae, 7-9 mm longae, inferiores glabrae, superiores albi-pilosae, basi per 3-4 mm petiolo adnatae, inter se connatae. Folia 5-10 cm longa, petiolo 1-3,5 cm longo, sicut rachis dense longr et brevissime patenter albi-piloso. Foliola 12-13 juga anguste elliptica, acuta vel acuminata, 6-10 mm longa et 2-3 mm lata, utrinque subappresse pilosa. Inflorescentiae multiflorae, pedunculo (2-) 5-10 cm longo, sicut rachis piloso suffultae. Bracteae lineari-lanceolatae, ca. 6-7 mm longae, albi- et nigri-pilosae. Calyx tubulosus, 13-14 mm longus, albi-nigri-pilosus, dentibus linearibus, ca. 4-5 mm longis. Corolla flava. Vexillum ca. 21 mm longum, lamina oblonga, antice retusa vel leviter emarginata. Alae 19 mm longae, lamina anguste elliptica, antice obtusa, basi auriculata, auricula ca. 1,5 mm longa, ungue lamina sublongiore. Carina ca. 17 mm longa, lamina elliptica, antice obtusa, ungue lamina sesquilongiore. Ovarium pilosum, stipitatum. Legumen ignotum.

Other specimens seen:

Azarbayejan: Pass ca. 20 km S of Ahar on the road to Tabriz, 1700-1800 m, 31.5.1978, *Wendelbo & Assadi 27948* (TARI); 20 km to Tehran-Tabriz road on the road from Ahar, 1450 m, 31.5.1978, *Wendelbo & Assadi 28006* (TARI).

43. *Astragalus caligineus* Maassoumi sp. nov.

Holotypus: Chaharmahal-e Bakhtiari, Lordegan Monj, Badamestan, Kuh-e Badamestan, N of Bon-e gard, 30.5.1986, 1500-2350 m, *Mozaffarian 54709* (TARI!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 60 (habit); - pages 221 (indument of peduncle and pods) and 224 (flower dissection).

Species differs from *A. alamouticus* Maassoumi and *A. idoneus* Maassoumi & Podlech by the indumentum of long and short spreading hairs (not short and appressed).

Plantae perennes, ca. 18-20 cm altae, acaules vel breviter caulescentes, caulibus ad 5 cm longis, caudex multiceps. Stipulae lanceolatae, ca. 8 mm longae, albi-nigri-pilosae, margine longe ciliatae, basi per 3 mm petiolo adnatae, inter se connatae. Folia 9-10 cm longa, petiolo 2,5-3 mm longo, sicut rachis longe et brevissime patenter albi-piloso. Foliola ca. 16 juga, glauca, ca. 10 mm longa et 5 mm lata, supra glabra vel marginem versus sparse pilosa, subtus subappresse pilosa. Inflorescentiae axillares, pedunculo ca. 10 cm longo, sicut rachis piloso sed apicem versus sparse pilis nigris immixtis suffultae. Bractee lineares, ca. 7 mm longae, predominante nigri-pilosae. Calyx tubulosus, ca. 14 mm longus, patule albi-nigri-pilosus, dentibus linearibus ca. 4 mm longis. Corolla flava. Vexillum ca. 19 mm longum, lamina rhomboida, ca. 7 mm lata, apicem versus breviter ligulata. Alae ca. 15 mm longae, lamina elliptica, antice rotundata, basi auriculata, auricula ca. 1,5 mm longa. Carina ca. 14 mm longa, lamina oblique elliptica, ungue laminam aequante. Ovarium pilosum, sessile. Legumen breviter stipitatum, ovoideum, ca. 10 mm longum et 4-5 mm latum, apice rostratum, rostro ca. 4-5 mm longo, curvato, ventre carinatum, dorso sulcatum, dense longe et brevissime patenter pilosum, complete biloculare, oligospermum.

Other specimens seen:

Chaharmahal-e Bakhtiari: Lordegan, Monj, Badamestan, Kuh-e Badamestan, N of Bon-e gard, 1500-2350 m, *Mozaffarian 54708* (TARI); Lordegan, Kohian, (protected station of Research Institute), 1710 m, 25.5.1986, *Mozaffarian 54429* (TARI); Shahr-e Kord, Baba-Heidar, 2150-2500 m, *Termeh & Isadyar 40946* (EVIN).

Esfahan: Khonsar to Buin-Miandasht, Kouh-e Hossein-Abad (2700-2900 m), 17.6.1989, *Termeh, Karavar & Tehrani s.n.* (EVIN).

15. *Astragalus rawlinsianus* group

Plants acaulescent, very rarely caulescent. Leaflets densely hairy. Inflorescence capitate or densely ovate. Bracts linear. Standard limb rhomboid. Flower violet.

Astragalus rawlinsianus.

44. *Astragalus rawlinsianus* Aitch. & Baker in Trans. Linn. Soc. London, Bot. 3: 51. 1888.

Type: Afghanistan, Badghis, May 1885, *Aitchison 357* (K!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag.* Iran 2: plate 94 (habit); - pages 218 (indument of peduncle and pods) and 224 (flower dissection).

Plants ca. 12-20 cm tall, usually prostrate at the surface of the soil, sometimes with short stem up to 4 cm long. Stipules pilose, ca. 8 mm long, triangular or lanceolate, abruptly attenuate, at a length of ca. 4 mm adnate to the petiole, distinctly rugose. Leaves ca. 7-9 cm long, petiole ca. 2-3 cm long, both petiole and rachis covered with spreading, long hairs. Leaflets 9-13 pairs, obovate or elliptic, at the apex obtuse or emarginate, 5-10 mm long and 3-6 mm broad, upper side scattered and lower side densely covered with spreading long hairs. Inflorescence capitate or spike-like with numerous flowers; peduncle 9-12 cm long, covered with long silky hairs. Pedicels nearly absent. Bracts linear, ca. 6-7 mm long, covered with black and white hairs. Calyx pale violet, 8-11 mm long, covered with black and white hairs, the teeth setaceous ca. 3-4 mm long. Corolla violet. Standard ca. 18 mm long, the limb rhomboid, ligulately attenuate toward the apex, ca. 7,5 mm broad, at the base near the claw constricted. Wing-petals ca. 14 mm long, the limb narrowly elliptic, attenuate toward the apex, round-tipped, at the base auriculate, auricle ca. 1,5 mm long, claw slightly shorter than the limb. Keel

ca. 12 mm long, the limb elliptic-oblique, somewhat recurved, claw equaling the limb. Ovary pilose, shortly stipitate. Pods nearly sessile, 7-11 mm long, ventrally carinate, dorsally deeply sulcate, with a long recurved, subulate beak 5-9 mm long, densely villous, fully bilocular.

Specimens seen:

Gorgan: Golestan park; inter Sharlegh and Cehshm-e Khan, 1350 m, *Maassoumi 47548* (TARI); Shah-Passand to Shahroud, South side of pass Gardaneh Kosh-Yeilagh, 1800 m, 22.6.1974, *Wendelbo & Foroughi 12873* (TARI); Golestan Park, inter Sharlegh and Cheshm-e Khan, 1350 m, 7.5.1984, *Maassoumi 47549* (TARI); Golestan Park Sharlegh Station, 1300 m, 8.5.1984, *Maassoumi 47587, 47591* (TARI); Mohammad Reza Shah Wild life Park, near bojnurd road, along to Bekadeh Artemisia-stepp, 1250 m, 2.5.1974, *Wendelbo, Foroughi, Sanii, Shirdelpu 11057* (TARI); Golestan Forest, Almeh, 1600 m, 9.5.1972, *Sabeti 6273* (TARI); 15 km from Maraveh tappeh on the road, to Ashkhaneh, 380 m, 23.4.1986, *Assadi & Massoumi 55580* (TARI); Mohammad Reza-Shah wild life Park, Almeh, 1750 m, *Wendelbo & Foroughi 12654* (W); Bojnurd, Almeh road, 1800 m, 18.5.1972, *Foroughi 6097* (TARI).

Semnan: Shahpassand to Shahrud, after pass, 1800-1950 m, *Wendelbo & Assadi 29688, 29703* (TARI).

Khorassan: Between Ghoochand and Darreh-Gaz, Randooreh National Park, Shakrab, 2300 m, 27.5.1984, *Assadi & Maassoumi 50579* (TARI); Ghuchan, 31 km, Darreh-Gaz road, 1940 m, 27.5.1972, *Foroughi 5876* (TARI); Esferayen, N slope of Kuh-e Shah Jahan from Darpachin-e bala village, 1700-2500 m, 7.6.1984, *Mozaffarian 48577* (TARI); ca. 30 km between Esferayen and Bojnurd, Assadi neck mt. 1800-2000 m, 29.6.1984, *Mozaffarian 48703* (TARI); 68 km on the road to Gifan from Bojnoord, after Amirabad, 1200 m, 22.5.1984, *Assadi & Maassoumi 50277* (TARI); ca. 14 km NE of Gifan, mountains N of Yazdan-Abada, 2000 m, 22.5.1984, *Assadi & Maassoumi 50332* (TARI); Shirvan, Mabanlou to Ghal-e Alkhans, 1650 m, *Termeh 41063* (Evin).

16. *Astragalus indomitus* group

Plants acaulescent or with short stem. Leaflets narrowly elliptic or linear, covered with appressed hairs. Inflorescence a spike. Standard rhomboid, acute at the apex.

Astragalus indomitus.

45. *Astragalus indomitus* Maassoumi sp. nov.

Holotypus: Tehran: Damavand, Humand station, 12.4.73, 1800 m, *Arazm & Bazargan 30771* (TARI!).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 73 (habit); - pages 220 (indument of peduncle and pods) and 224 (flower dissection).

This species is easily distinguishable by the narrowly elliptic leaflets and the narrowly rhomboid standard limb.

Plantae perennis, ca. 20 cm altae, acaules vel breviter caulescentes, caule ca. 3-4 cm longo, dense brevissime appresse albi-piloso. Stipulae lanceolatae, acuminatae, 4-6 mm longae, albi-nigri-pilosae, ad basin per 1-2 mm petiolo adnatae, inter se connatae. Folia ca. (4-) 5-9 (-11) mm longa, petiolo ca. 2-4 cm longo, sicut rachis dense brevissime subappresse piloso. Foliola 9-10 juga, anguste elliptica, 5-7 (-9) mm longa et 2-3 mm lata, supra glabra vel marginem versus sparse pilosa, subtus subappresse albi-pilosa. Inflorescentiae axillares, pedunculo 9-12 cm longo, dense brevissime albi-piloso, apicem versus pilis nigro piloso immixtis. Bractee lineares, ca. 10-11 mm longae, subpatenter albi-nigri-pilosae. Calyx tubulosus, 14-15 mm

longus, longe patenter albi-nigri-pilosus, dentibus linearibus, ca. 4-5 mm longis. Corolla purpurea. Vexillum ca. 20 mm longum, lamina rhomboida, antice subacuta. Alae ca. 17 mm longae, lamina-anguste elliptica, antice rotundata, basi auriculata, auricula ca. 1,5 mm longa, ungue lamina sublongiore. Carina ca. 16 mm longa, lamina oblique elliptica, ungue lamina sesquolongiore. Ovarium pilosum sessile. Legumen breviter stipitatum, ovoideum, ca. 10 mm longum et 4 mm latum, ventro late carinatum, dorso applanatum et sulcatum, longe albilanatum, pilis brevissimis patentibus immixtis, complete biloculare.

Other specimens seen:

Tehran: Karaj, between Nesa and Gachsar, 2220 m, 2.6.1986, *Maassoumi 55102* (TARI); Lavasan, 1940 m, 26.4.1973, *Babakhanlou 20466* (TARI); Zardband, 3.5.1974, *Matin & Zargani s.n.* (EVIN).

17. *Astragalus galbineus* group

Plants acaulescent or with a short stem. Leaflets covered with short appressed hairs on both sides or more or less glabrous above. Inflorescence cylindric. Flowers violet or purplish. Standard rhomboid. Wing-petals slightly emarginate at apex.

Astragalus galbineus, *A. sarae*, *A. nahavandicus*.

46. *Astragalus galbineus* Maassoumi in Iran. J. Bot. 4: 130. 1988. **Holotype:** Lorestan, Khora-mabad, Dorud, Oshtoran Kuh, 2150 m, 6.5.1973, *M. Riazi 9692* (TARI!).

Fig.: MAASSOUMI, A.A., 1993, Illustr., guide gen. Astrag. Iran 2: plate 66 (habit); - pages 220 (indument of peduncle and pods) and 224 (flower dissection).

Plants ca. 25-30 cm tall, acaulescent or with a short stem up to 4 cm long. Stipules lanceolate, or triangular, ca. 10 mm long, abruptly attenuate toward the apex, at a length of ca. 2 mm adnate to the petiole, shortly jointed to one another, covered with appressed white and black hairs. Leaves ca. 14-15 cm long, petiole ca. 4 cm long, both petiole and rachis covered with black and white subpatent hairs. Leaflets 10-12 pairs, oblong-elliptic, 10-15 mm long and 4-5 mm broad, at the apex incised, at the base cordate, both sides covered with short appressed hairs. Inflorescence subterminal, cylindrical with numerous flowers; peduncle ca. 15 cm long, sulcate, in lower part covered with white hairs and below the raceme mixed with patent black hairs. Bracts linear, ca. 10 mm long, densely covered with spreading black and white hairs. Calyx ca. 16-17 mm, shortly inflated at the base, covered with black and white hairs, the teeth linear, ca. 5 mm long. Corolla violet. Standard ca. 18-19 mm long, the limb rhomboid, in the middle ca. 9 mm broad, towards the tip ligulate, at the apex deeply emarginate or bilobate, at the base toward the claw shortly constricted. Wing-petals ca. 18 mm long, the limb oblong, towards the apex shortly dilated, asymmetrically notched, at the base auriculate, auricle ca. 2 mm long, the claw equaling the limb. Keel ca. 15 mm long, the limb elliptic-curved, at the apex shortly acute, at the base auriculate. Pods shortly stipitate, oblong or elliptic, ca. 10 mm long and 4-5 mm broad, terminating in a beak, ventrally slightly carinate, dorsally grooved, covered with long soft and short white hairs, fully bilocular.

Specimens seen:

Lorestan: Doroud, Gharieh-ye Saravand, Payamoun mts. (1959-2200 m), 29.5.1988, *Termeh, Karavar & Tehrani s.n.* (EVIN); Khoramabad, Dorud, Oshtoran Kuh, 2150 m, 6.5.1973, *M. Riazi*

9692 (TARI!).

47. *Astragalus sarae* Eig, Syst. Stud. Astrag. Near East: 40. 1955. **Type:** Iraq borealis: Jebal Sindjar, supra Beled Sindjar, 1000-1500 m, *Eig & Zohary* (HUJ!).

Fig.: Page 226 (flower dissection).

Plants perennial, acaulescent or shortly caulescent, stem up to 5 cm long. Stipules lanceolate, ca. 6-7 mm long, densely covered with black and white hairs, at a length of 1,5-2 cm adnate to the petiole and jointed to one another. Leaves ca. 8-9 cm long, petiole 2-3 cm long, both petiole and rachis densely covered with long and short spreading mixed black and white hairs. Leaflets 9-11 pairs, obtuse or emarginate, ca. 8 mm long and 3-5 mm broad, upper side nearly glabrous, only toward the margin with appressed hairs, lower side subappressed-hairy. Inflorescence dense; peduncle ca. 7-10 cm long, sulcate, covered with long and short spreading hairs, upwards mixed with black hairs. Bracts linear-lanceolate, ca. 7-9 mm long, covered with black and white hairs. Calyx tubular, slightly inflated, ca. 13-14 mm long, with long and short black and white hairs, the teeth linear, ca. 4 mm long. Corolla violet. Standard 19-20 mm, the limb rhomboid, ca. 8 mm broad, emarginate at apex. Wing-petals ca. 16 mm long, the limb elliptic, slightly emarginate at the apex, at the base auriculate, auricle ca. 1 mm long. Keel ca. 15 mm long, the limb elliptic, acute. Ovary pilose, stipitate. Pods ovoid, ca. 8 mm long and 3 mm broad, rostrate, ventrally carinate, dorsally rounded, densely covered with lanate hairs, mixed with short spreading hairs, fully bilocular.

Notes: Species newly recorded from Iran.

Specimen seen:

Kordestan: Fagha Solemann, S of Sanandaje, 30 km from Sanandaje, 1400 m, 14.5.1986, *Fattahi* 236 (TARI).

48. *Astragalus nahavandicus* Maassoumi, in Mitt. Bot. Staatssamml. München: 29: 506. 1990. **Holotype:** Hamadan: ca. 21 km on the road from Nahavand to Malayer, 2000 m, 11.5.1987, *Maassoumi & Mirhosseini* 59365 (TARI! Iso. Herb. PODLECH!).

Fig.: MAASSOUMI, A.A., 1993, Illustr., guide gen. Astrag. Iran 2: plate 86 (habit); - pages 220 (indument of peduncle and pods) and 224 (flower dissection).

Plants acaulescent, ca. 11-13 cm tall. Stipules triangular, ca. 4-5 mm, long, densely hairy, at the base shortly adnate to the petiole and jointed to one another. Leaves ca. 8-11 cm long, petiole ca. 1,5-2 cm long, both petiole and rachis densely covered with long and short spreading hairs. Leaflets 15-17 pairs, narrowly elliptic or linear, complicate, ca. 10 mm long and 3 mm broad, upper side glabrous, lower side covered with subappressed hairs. Inflorescence a cylindric spike, flowers numerous; peduncle ca. 5-6 cm long, densely covered with black and white hairs mixed with shorter spreading white hairs. Bracts linear-lanceolate, ca. 5-6 mm long, covered with black and white hairs. Calyx tubular, ca. 11 mm long, with black and white hairs, the teeth subulate ca. 3 mm long. Corolla purplish or dark violet. Standard ca. 16 mm long, the limb rhomboid, ca. 8-9 mm broad, emarginate at the apex. Wing-petals ca. 16 mm long, the limb narrowly elliptic, rounded at the apex, at the base auriculate,

auricle ca. 2 mm long, the limb equaling the claw. Wing-petals ca. 13 mm long, the limb oblique-elliptic, nearly equaling the claw. Ovary pilose, sessile. Pods unknown.

Specimens seen:

Hamadan: Ca. 21 km on the road from Nahavand to Malayer, 2000 m, 11.5.1987, *Maassoumi & Mirhosseini 59366* (TARI).

Lorestan: Doroud, Saravand village, Kuh-e Payamoun, 1950-2200 m, *Termeh, Karavar & Tehrani (s.n.)* (EVIN).

Bakhtaran: Kuh-e parrow, 1500-2100 m, *Iranshahr & Dezfolian 40838* (EVIN).

18. Astragalus rivashensis group

Plants shortly caulescent. Both petiole and rachis covered with spreading hairs. Leaflets covered with scattered hairs on upper side, densely covered with spreading hairs on lower side. Flowers yellow. Standard limb elliptic. Pods stipitate, densely covered with long and short spreading hairs.

Astragalus rivashensis.

49. Astragalus rivashensis Maassoumi in Iran. J. Bot. 4: 139. 1988. **Holotype:** Khorasan, 56 km from Kashmar to Neyshabour after river (FE2), 1850 m, 12.6.1981, *Assadi & Mozaffarian 35657* (TARI!).

Fig.: MAASSOUMI, A.A., l.c.: 140 (habit); 1990, Illustr. guide gen. Astrag. Iran 2: plate 92 (habit); - pages 220 (indument of peduncle and pods) and 226 (flower dissection).

Plants ca. 20-30 cm tall, stem 3-4 cm long. Stipules lanceolate, acuminate ca. 7-12 mm long, covered with black and white hairs, at a length of ca. 2 mm adnate to the petiole, toward the apex abruptly attenuate. Leaves ca. 10-15 (-20) cm long, petiole 4-5 cm long, both petiole and rachis densely covered with spreading hairs. Leaflets 8-11 pairs, narrowly elliptic, 8-17 mm long and 4-6 mm broad, round-tipped or retuse, upper side scattered, lower side densely covered with spreading white hairs. Inflorescence axillary, cylindric, flowers numerous. Bracts linear, 5-8 mm long, covered with spreading black and white hairs. Calyx tubular, ca. 13-15 mm long, covered with spreading black and white hairs, the teeth triangular-acuminate, ca. 3-4 mm long. Corolla yellow. Standard ca. 20 mm long, the limb elliptic, ca. 7 mm broad, round-tipped, constricted at the base. Wing-petals ca. 18 mm long, the limb elliptic, ca. 7 mm long, round-tipped, at the base with an auricle ca. 1,5 mm long, 1/2 length of the claw. Keel ca. 18 mm long, the limb oblique-elliptic, acute-tipped, 1/2 length of the claw. Ovary pilose. Pods with a stipe 2 mm long, ovate-oblong, ca. 10-12 mm long and ca. 5 mm broad, terminating in a recurved, subulate beak, ventrally carinate, dorsally sulcate, densely covered with long, spreading, white hairs mixed short patent white hairs, fully bilocular. Seeds 4, reniform ca. 4 mm long and 2 mm broad, alveolate, brown.

Specimens seen:

Khorasan: 20 km to Kashmar on road from Neyshabour, 1800 m, 11.6.1981, *Assadi & Mozaffarian 35537* (TARI); Mts. N of Neyshabour, 1450-1600 m, 16.6.1981, *Assadi & Mozaffarian 35978* (TARI); 14 km from Kashmar to Neyshabour 1400-1500 m, 12.6.1981, *Assadi & Mozaffarian 35621* (TARI); Esferayen, vers Sabzevar, Kuh-e-Jahan, 1400-1750 m, Terme (s.n.) (Evin); In collibus Torbat-e Heydari, 1300 m, *Rechinger, Aellen & Esfandiari 4356* (W).

19. *Astragalus spachianus* group

Plants acaulescent, densely covered with silvery appressed hairs. Inflorescence a spike. Flowers yellow. Standard limb ovate-oblong. Pods ellipsoid.

Astragalus spachianus, *A. saccatus*.

50. *Astragalus spachianus* Boiss. & Buhse in Nouv. Mém. Soc. Imp. Naturalistes Moscou 12: 67. 1860. **Type:** pr. Jesd, 1.5.1849, *Buhse* (non vidi).

Fig.: MAASSOUMI, A. A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 98 (habit); - pages 217 (indument of peduncle and pods) and 226 (flower dissection).

Plants ca. 10-20 cm tall, acaulescent or with short stem ca. 3 mm long. Stipules ca. 3-5 mm long, lanceolate, acuminate, at a length of 1-2 mm adnate to the petiole, covered with white hairs or with mixed white and blackish hairs. Leaves ca. 6-10 cm long, petiole ca. 2-5 cm long, covered with short appressed hairs. Leaflets 7-11 pairs, narrowly elliptic, 7-9 mm long and 2-4 mm broad, both sides covered with appressed or subpatent hairs. Inflorescence a spike; peduncle ca. 7-14 cm long, covered with long and short spreading white hairs, sometimes mixed with blackish hairs. Pedicel nearly absent. Bracts ca. 3-4 mm long, covered with black and white hairs. Calyx ca. 12-13 mm long, pale violet, covered with white hairs or mixed with black hairs. Corolla yellow, at length turning violet. Standard ca. 18-24 mm long, the limb elliptic or obovate, at the tip slightly emarginate, near the claw constricted. Wing-petals 16-22 mm long, the limb elliptic, dilated towards the apex, round tipped, at the base auriculate, the claw 1.5 times longer than the limb. Keel 15-20 mm long, the limb oblique-elliptic or slightly curved, claw 2 times longer than the limb. Ovary pilose, shortly stipitate. Pods shortly stipitate, ca. 15 mm long and 5 mm broad, ventrally rounded, dorsally applanate and sulcate, covered with long, silky hairs, mixed with short patent whitish hairs, fully bilocular.

Notes: Specimens collected from Baluchestan area are in the indument characters different from those of other regions. Further studies are necessary in this respect.

Specimens seen:

Esfahan: 60 km E of Shahreza, Shah Ghandab, 1900-2150 m, 24.5.1975, *Foroughi 17253*, (TARI); 140 km from Mootch to Esfahan, 1950 m, 3.5.1974, *Rechinger 46793* (W); 35 km, *41403* (EVIN); 150 km NE Esfahan, Mootch protected area, Tang-e duzdan, 2150-2300 m, *Termeh & Tehrani 41403* (EVIN); 150 km NE Esfahan, Mootch protected area, 31.5.1974, *Iranshahr s.n.* (EVIN); 10 km N Najafabad (30 km W Esfahan), 1800 m, Juin 65, *Pabot AE 88* (TARI); Borujen, Bakhtiari mts., 1700 m, 17.5.1983, *Nowroozi 2529* (Herb. Esf.).

Fars: Fasa, Kharman-kuh, 2500 m, 6.6.1983, *Mozaffarian 46909* (TARI); N. Shiraz, 3.6.1965, *Ledingham & Assefi 4110* (TUH), Aliabad Kamin, 6.6.1988, *Kash-Kui 1412* (Evin).

Chaharmahal-e Bakhtiari: Brojen, 2200 m, 29.6.1986, *Mozaffarian 57181* (TARI); 39 km from Shahreza to Semirom, 2300 m, 5.6.1974, *Alava 1345* (Evin); *ibid.*, *Iranshahr s.n.* (Evin); Prope Semirom, Kuh-e Surmandeh, 2750-3600 m, 7.6.1974 (Evin); Inter Shahreza et Semiran 10 km S Kohrueh, 5.6.1974 (Evin).

Hormozgan: Kuh-e Genu, 7.3.1973, *Iranshahr & Moussavi 15468* (Evin); Kuh-e Genu, 2000-2300 m, 5.5.1977, *Sojak 7736* (PR); *ibid.*, *Mozaffarian & al. 39804* (TARI).

Kerman: Kerman, Lalehzar, Baghabad, 2600 m, 19.6.1975, *Foroughi & Assadi 17906* (TARI); Gheytol-Arab on the road to Kuh-e Hazar, 2350 m, 15.6.1975, *Foroughi & Assadi 16203* (TARI); on the way of Kuh-e Hazar, 2700 m, 15.5.1975, *Foroughi & Assadi 16216* (TARI); Khabar va-Rochun protected region, 50 km SW of Baft, E side of Kuh-e Khabar, 12 km E of Khabar, 2800 m, 8.6.1977, *Assadi, Edmondson & Miller 1679* (TARI); in montibus Lalehzar, 2800-400 m, 25.5.1977, *Sojak 7751*

(PR); Inter Bam et Djiroft, Deh-Bakri, 2100 m, *Rechinger, Aellen & Esfandiari 3680* (Evin); Chah Choghuk, 1400 m, 3219 (Evin); Kuh-e Lalehzar, 3000 m, 11.7.1982, *Bornmüller 3774* (B); 4 km SW of Baft, 2000 m, 2.5.1975 *parris 75.309* (E).

51. *Astragalus saccatus* Boiss., Diagn. Pl. Or. Nov. 9: 53. 1849. Type: prope Isfahan, *Aucher-Eloy 4431* (P!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 97* (habit).

Plants acaulescent, ca. 10-18 cm tall, densely covered with short silvery hairs. Stipules triangular, ca. 2-3 mm long, at the base shortly adnate to the petiole and jointed to one another, covered with white, subappressed hairs. Leaves 5-6 cm long, petiole ca. 1-1.5 cm, both petiole and rachis covered with short spreading hairs mixed with few isolated long white hairs. Leaflets 5-8 (-10) pairs, oblong-elliptic, 7-9 mm long and 4-5 mm broad, covered with subappressed hairs on both sides. Inflorescence a 10-12-flowered spike; peduncle ca. 2 mm thick and 5-8 cm long, densely covered with short spreading hairs mixed with some isolated long white hairs. Bracts linear, lanceolate, ca. 5 mm long, covered with spreading white hairs, very rarely mixed with few black hairs. Calyx tubular, 13-15 mm long, slightly inflated at base, but ruptured by the fruit, covered with short spreading white hairs, the teeth 2-2.5 mm long, covered with short hairs. Standard ca. 21 mm long, the limb oblong. Wing-petals ca. 18 mm long, the limb oblong, slightly dilated toward the tip, at the base auriculate, auricle ca. 1.5 mm long, claw nearly twice as long as the limb. Ovary pilose, shortly stipitate. Pods nearly sessile, ca. 13 mm long and 4 mm broad, attenuate at the apex, ventrally rounded, dorsally sulcate, densely covered with long hairs mixed with short spreading hairs, fully bilocular.

Notes: This species has been transferred from section *Grammocalyx* Bunge to section *Malacothrix* Bunge.

Specimens seen:

Isfahan: Tiran, Ghameshlow, Tang-e Najafabadi, 2100 m, *Nowroozi, Feyzi & Shamanpoor 5318, 5465* (TARI); on the road from Shahreza to Semirom, 45 km to Semirom, 2370 m, *Zarre 69621* (TARI); 6 km from Shahreza on the road to Shiras, Kuh-e Dombalan, 2000 m, *Foroughi 17273* (TARI); 60 km E of Shahreza, Shah-Ghandab, 1900-2150 m, *Foroughi 17293* (TARI); Brojen, 2200 m, *Mozaffarian 57181* (TARI).

Kerman: Shahrak-e Maadan-Mes, 65 km SW Rafsanjan, 2500-2600 m, *Djadidi 23816* (TARI).

Fars: 60 km S of Abadeh, Kuh-e Bul, prope Eghlid, 2470 m, *Foroughi 17371* (TARI); Tangh-e Kalanje, NW Sisakht, 2420 m, *Safayian 182* (TARI).

Baluchestan: Taftan mts. region, Tamendan valley 2300-2500 m, *Mozaffarian 53133* (TARI); Taftan mt. S slope, above Torshab, 1900-2300 m, *Runemark, Assadi & Sardabi 22646, 22632* (TARI); ca. 40 km N of Khash, Torshab, 2000-2300 m, *Assadi 22859* (TARI).

20. *Astragalus heterodoxus* group

Plants caulescent, covered with silvery appressed hairs. Leaflets verticillate. Inflorescence axillary. Flowers greenish-yellow. Standard obovate.

Astragalus heterodoxus.

52. *Astragalus heterodoxus* Bunge in Mém. Acad. Imp. Sci. Saint Petersburg, 11 (16): 53. 1868 in clave et l.c. 15(1): 88. 1869. **Typus:** Persia austro-orient., supra pagum Dirachtinshan, inter Chäbbis et Kerman (P!).

Fig.: MAASSOUMI, A.A., 1990, Illustr. guide gen. Astrag. Iran 1: plate 86 (habit); - pages 218 (indument of peduncle and pods) and 226 (flower dissection).

Plants ca. 15-30 cm tall, acaulescent or with developed stem up to 15 cm long. Stipules ca. 10 mm long, covered with short black and white hairs, toward the apex abruptly acuminate, setaceous, at a length of ca. 3 mm adnate to the petiole, otherwise free or sometimes jointed to one another. Leaves 9-16 cm long, petiole 2-6 cm long, both petiole and rachis covered with short patent hairs and rarely mixed with long spreading hairs. Leaflets verticillate, in 7-8 verticils of 4 leaflets narrowly elliptic, ca. 16 mm long and 2-6 mm broad, both sides covered with appressed hairs. Inflorescence a cylindrical spike ca. 7-9 cm long, peduncle 10-11 cm long, covered with short hairs, towards the inflorescence mixed with some black hairs. Pedicel short. Bracts linear, ca. 6-7 mm long, covered with appressed blackish hairs, or rarely mixed with white hairs. Calyx tubular, ca. 14-15 mm long, covered with long silky white hairs and rarely with scattered black hairs. Corolla yellow, turning to violet. Standard ca. 20 mm long, the limb obovate, emarginate or incised at the tip, at the base near the claw constricted. Wing-petals ca. 17 mm long, the limb elliptic, round tipped, at the base auriculate. Keel ca. 16 mm long, the limb oblique-elliptic, claw two times longer than the limb. Ovary pilose, sessile. Pods ovoid, ca. 11 mm long and 2 mm high, ventrally rounded, dorsally appanate, covered with long soft whitish hairs mixed with short spreading hairs, bilocular, few-seeded.

Specimens seen:

Kerman: Sekondj, at the hills to the NW of the village, steppic vegetation, 2170-2250 m, 10.5.1985, *Zehzad 85049* (TARI); near Sarcheshmeh copper mine, 2700 m, 3.6.1986, *Assadi & Bazargan 56425* (TARI); ca. 70 km NW of Rawar, near the town Kuhbanan, Davedan mt. 2400-3200 m, 31.5.1986, *Assadi & Bazgosha 56148* (TARI).

Yazd: Ca. 50 km E of Baft mts. above the village Hamsook, 2300-2600 m, *Assadi & Bazgosha 56102* (TARI).

21. *Astragalus chrysotrichus* group

Plants caulescent. Petiole and rachis covered with long and short spreading hairs. Leaflets covered with scattered patent hairs on upper side and subappressed hairs on lower side. Inflorescence axillary, cylindric. Calyx teeth linear, ca. 6 mm long. Flowers yellow. Standard rhomboid. Pods covered with long and short spreading hairs.

Astragalus chrysotrichus.

53. *Astragalus chrysotrichus* Boiss., Diagn. Pl. Or. Nov. 2: 75. 1843. **Typus:** Persia austr., inter Fars et Shiraz, *Aucher-Eloy 4414* (G-BOIS, K!).

Fig.: Pages 217 (indument of peduncle and pods) and 226 (flower dissection).

Plants caulescent, up to 36 cm tall, densely covered with long subappressed hairs. Stipules lanceolate, acuminate, ca. 10-11 mm long, densely covered with black and white hairs, at the base distinctly rugose, at a length of 3-4 mm adnate to the petiole and shortly jointed to one another. Leaves ca. 10-11 cm long, petiole ca. 6 cm long, both petiole and rachis covered with

long and short spreading hairs. Leaflets 15 pairs, narrowly elliptic, acute, ca. 12 mm long and 4-5 mm broad, upper side subglabrous or sometimes with some scattered long spreading hairs, lower side densely covered with long subappressed hairs. Inflorescence cylindric, elongating in fruit, peduncle ca. 13-14 cm long, sulcate, covered with short and long spreading hairs. Bracts linear, 12-15 mm long, ciliate at the margin or covered with some scattered black and white hairs. Calyx tubular, ca. 15 mm long, covered with long hairs, the teeth setaceous, ca. 6 mm long. Corolla yellow. Standard ca. 18-19 mm long, the limb rhomboid, in middle part ca. 6 mm broad. Wing-petals ca. 16-17 mm long, the limb narrowly elliptic, rounded at the tip, auriculate at the base, auricle ca. 0,5 mm long, claw much longer than the limb. Keel ca. 15 mm long, the limb elliptic-curved. Ovary pilose, sessile. Pods shortly stipitate, ovoid, ca. 12 mm long and 4-5 mm broad, ventrally slightly carinate, dorsally sulcate, attenuate toward the apex, ending in a long recurved beak ca. 5 mm long, densely covered with long hairs mixed with short spreading hairs, fully bilocular.

Notes: The double indument on vegetative part and the pods and the shape of petals clearly separate this taxon from its old synonym *A. mollis* M.Bieb.

Specimens seen:

Khorassan: Mounts Hazar Masjed, inter Ardak at Tolgor 1200-1600 m, 7.-10.6.1948, *Rechinger & Aellen 5018* (W).

Kordestan: Hassin-abad, 35 km N Sanandaj on road to Diwandarra, 1530 m, 30.5.1986, *Fattahi 724* (TARI).

Esfahan: Esfahan to Daran, Ghahis protected area, 2500 m, 5.5.1981, *Nowroozi 238* (Res. Cent. Esf.).

Tehran: 10 km E Tehran, 1600-1700 m, 10.5.1972, *Dini & Arazm 1554* (TARI); Chitgar, 1320 m, 27.4.1970, *Foroughi 74* (TARI).

22. *Astragalus daghdaghabadensis* group

Plants acaulescent. Leaflets glaucous, upper side glabrous, lower side covered with scattered short, appressed hairs. Stipules glabrous.

Astragalus daghdaghabadensis

54. *Astragalus daghdaghabadensis* Maassoumi in Iran. J. Bot. 5: 3. 1991. **Holotype:** Hamadan, Kabutar-Ahand, Daghdaghabad, Gholiabad, Kuh-e Gholiabad, 1800-2100 m, 4.6.1988, *Mozaffarian 64502* (TARI!).

Fig.: MAASSOUMI, A. A., 1993, Illustr. guide gen. Astrag. Iran 2: plate 64 (habit); - pages 220 (indument of peduncle and pods) and 226 (flower dissection).

Plants acaulescent, glaucous, ca. 13-22 cm tall. Caudex much divided. Stipules 4-8 mm long, lanceolate, acuminate, glabrous or ciliate at the margin, at the base distinctly rugose, at a length of 2 mm adnate to the petiole, shortly jointed to one another. Leaves ca. 8-10 cm long, petiole 2-3,5 cm long, both petiole and rachis covered with black and white appressed hairs. Leaflets ca. 12-13 pairs, oblong, at the apex rounded or retuse, ca. 5-8 mm long and 2-3 mm broad, upper side glabrous, lower side covered with very short appressed hairs. Inflorescence solitary, peduncle ca. 7-13 cm long, covered with spreading white hairs, toward the inflorescence mixed with black hairs, flowers numerous, nearly sessile. Bracts linear-lanceolate, acuminate, ca. 5-8 mm long, pilose. Calyx 14-15 mm long, tubular, shortly inflated, densely

covered with long black and white hairs, the teeth linear, ca. 5 mm long. Corolla yellow. Ovary pilose, sessile. Pods shortly stipitate, ovoid, ca. 10-12 mm long and 4-5 mm broad, ventrally slightly carinate, dorsally deeply sulcate, rostrate, the beak curvate, densely lanate, fully bilocular.

Specimens seen:

Hamadan: Kabutar-ahang, Daghdaghabad, Goliabad, Kuh-e Goliabad, 1800-2100 m, 4.6.1988, *Mozaffarian 64502* (TARI).

Azarbayejan: 44 km S Rezaiyeh, Darreh-e Ghasemlou, 1850-1990 m, 10.6.1978, *Matin & Daneshpajou 38407* (Evin).

23. *Astragalus hendelanicus* group

Plants shortly caulescent. Petiole and rachis covered with spreading hairs. Leaflets covered with appressed hairs. Inflorescence axillary, cylindric. Flowers yellow. Standard obovate. Pods densely covered with long and short, spreading hairs.

Astragalus hendelanicus.

55. *Astragalus hendelanicus* Maassoumi in Iran. J. Bot. 5: 14. 1991. Holotype: Azarbayejan, Mianeh to Khalkhal, ca. 32 km, on the road from Hendelan to Yal-Gheslagh, 1550 m, 27.5. 1987, *Maassoumi 64907* (TARI!, Iso. Herb. PODLECH!).

Fig.: MAASSOUMI, A. A., 1993, *Illustr. guide gen. Astrag. Iran 2: plate 70* (habit); - pages 220 (indument of peduncle and pods) and 226 (flower dissection).

Plants ca. 20-22 cm tall, acaulescent or with short stem up to 2,5 cm long. Stipules lanceolate, abruptly acuminate, ca. 10-11 mm long, glabrous or ciliate at the margin, at a length of 2-4 mm adnate to the petiole and shortly jointed to one another. Leaves ca. 15-17 cm long, petiole ca. 3-3.5 cm long, both petiole and rachis covered with spreading hairs. Leaflets 12-13 pairs, remote, oblong-elliptic, rounded at the apex or slightly emarginate, 10-15 mm long, and 4-6 mm broad, both sides covered with appressed hairs. Inflorescence a dense spike, peduncle 10-13 cm long, covered with short spreading white hairs, flowers numerous, nearly sessile. Bracts linear, filiform, ca. 10 mm long, with black and white hairs. Calyx tubular, ca. 14-15 mm long, covered with black and white hairs. Corolla yellow. Standard ca. 17 mm long, the limb obovate. Wing-petals ca. 15 mm long, the limb narrowly elliptic, rounded at the apex, auriculate at the base, auricle ca. 1,5 mm long, the limb equaling the claw. Keel ca. 14 mm long, the limb oblique-elliptic, equaling the claw. Ovary pilose, shortly stipitate. Pods shortly stipitate, ovoid, ca. 7 mm long and 3-4 mm broad, ventrally slightly carinate, dorsally applanate and sulcate, attenuate toward the apex and shortly rostrate, densely long-lanate, mixed with short spreading hairs.

Specimen seen:

Azarbayejan: Mianeh to Khalkhal, ca. 32 km on the road from Hendelan to Yal-ghenshlagh, 1500 m, 27.5.1987, *Maassoumi 64907* (TARI; Herb. PODLECH).

24. *Astragalus holopsilus* group

Plants caulescent. Leaflets glaucous, glabrous above, very short appressed hairs along the mid-vein on lower side. Inflorescence axillary. Flowers violet. Standard limb strongly ligulate-attenuate toward the apex.

Astragalus holopsilus, *A. lippertii*, *A. kabristanicus*.

- 56. *Astragalus holopsilus*** Bunge in Mém. Acad. Imp. Sci. Saint Pétersbourg 11 (16): 56. 1868 in clave et l.c. 15 (1): 83. 1869. **Syntypes:** Esfahan, *Jenisch*; dto., *Bode* (non vidi). = *A. stenocalyx* Eig, Syst. Stud. Astrag. Near East: 29. 1955. **Holotype:** Western Persia, Sultanabad, 24.5.1890, *Th. Strauss* (K!).

Fig.: MAASSOUMI, A. A. 1990, Illustr. guide gen. Astrag. Iran 1: plate 87 (habit); page 218 (indument of peduncle and pods) and 226 (flower dissection).

Plants up to 35 cm tall, caulescent, with developed glabrous stems. Stipules lanceolate, ca. 3-4 mm long, free from one another and the petiole. Leaves ca. 5 cm long, petiole short, ca. 1.5 cm long. Leaflets 9-10 pairs, elliptic, glabrous, ca. 10-12 mm long and 3-5 mm broad, acuminate, cuneate at the base. Inflorescence axillary, a dense spike, peduncle 7-9 cm, flowers numerous, pedicels with short hairs. Bracts ovate, ca. 2 mm long, covered with short black hairs. Calyx tubular, ca. 6-7 mm long, vested with spreading black and white hairs, the teeth triangular, ca. 1.5 mm long. Corolla violet. Standard ca. 20 mm long, the limb rhomboid, ca. 6 mm broad, ligulate-attenuate toward the apex, round-tipped. Wing-petals ca. 15 mm long, the limb narrowly elliptic, round-tipped, at the base auriculate, 2 times longer than the claw. Keel ca. 12 mm long, the limb oblique-elliptic or curvate, equaling the claw. Ovary pilose, sessile. Pods ovoid, ca. 8 mm long and 3 mm broad, ventrally applanate or shortly grooved, dorsally sulcate, terminating in a recurved beak, covered with long spreading white hairs, incompletely bilocular.

Specimens seen:

Esfahan: Vardasht-e Semirom, Ghoutapassi, 23 km SE Boroudjen, 2380 m, 25.5.1984, *Aryarand & Rahiminejad 10228 b* (Univ. Esf.); 35 km from Shahreza to Semirom, Gardaneh-e Khoros-Galou, 2300 m, 19.5.1986, *Mozaffarian 54347* (TARI); Shahr-e Kurd, Ben, Harchegan, 2650 m, 12.6.1987, *Mozaffarian 61085* (TARI); Shahr-e Kurd, Shalamzar, Agha-Sabz, 2400 m, 28.5.1986, *Mozaffarian 54590* (TARI); Khonsar, Khamis, Tchog Gard, 2300 m, 19.6.1989, *Termeh & Karavar* (s.n.) (Evin).

Chaharmahal-e Bakhtiari: Borojen, Boldaji Kalbibadk (Foot of mt. Kallar), 2250 m, 3.7.1986, *Mozaffarian 57350* (TARI); Tang-e Sayad, 2550 m, 3.6.1974, *Rechinger 47236* (W); Bordekan, 40 km N Kohruyeh between Shahreza and Semiron, 2700 m, 5.6.1974, *Rechinger 47387* (W).

Tehran: Arak to Mahallat, Neck Mt. close to Bozijan, 2300 m, 14.6.1984, *Mozaffarian & Maassoumi 47983* (TARI).

- 57. *Astragalus lippertii*** Maassoumi & Podlech in Mitt. Bot. Staatssamml. München 29: 513. 1990. **Holotype:** Azarbayegan, Rezayeh, Serow, 1870 m, 15.6.1972, *Foroughi 6313* (TARI!; Iso: Herb. PODLECH!).

Fig.: MAASSOUMI, A.A., 1993, Illustr., guide gen. Astrag. Iran 2: plate 81 habit); - pages 220 (indument of peduncle and pods) and 226 (flower dissection).

Plants ca. 35 cm tall, caulescent, covered with short appressed scattered hairs, stem ca. 10-12 cm long. Stipules ca. 8-10 mm long, at the base shortly adnate to the petiole, vaginate, jointed to one another, abruptly attenuate toward the apex. Leaves ca. 10-17 cm long, petiole 4-5 cm long, both petiole and rachis covered with short appressed, scattered hairs. Leaflets 11-13 pairs, elliptic, 6-15 mm long and 8-9 mm broad, rounded at the apex or shortly emarginate, upper side glabrous, lower side with some isolated appressed hairs along the mid-vein. Inflorescence a raceme ca. 5-6 cm long, peduncle ca. 15-18 mm long, sulcate, covered with short appressed white hairs or mixed with some black hairs, flowers numerous. Bracts green, linear-acuminate, 8-12 mm long. Pedicels short. Calyx 14-15 mm long, tubular, covered with long appressed or subpatent hairs, the teeth 5-6 mm long, linear. Corolla dark violet. Standard ca. 25 mm long, the limb rhomboid, ca. 10 mm broad, ligulate-attenuate toward the apex. Wing-petals ca. 17 mm long, the limb narrowly oblong, rounded at the apex, at the base auriculate, auricle ca. 2 mm long, the limb equaling the claw. Keel ca. 15 mm long, the limb oblique-elliptic or triangular, 1/2 length of the claw. Ovary sessile, pilose. Pods sessile, ovoid, rounded the base, acuminate at the apex, 12-14 mm long and ca. 7 mm broad, ventrally, carinate, dorsally deeply sulcate, fully bilocular.

Specimen seen:

Azarbayejan: Rezaiyeh, Serow, 1870 m, 15.6.1972, *Foroughi 6313* (TARI; Herb. PODLECH).

58. *Astragalus kabristanicus* Grossh. in Fl. USSR 12: 884. 1946. **Typus:** Distr. Chisy inter Alty-Agatsch et Chilmi'i, 12.5.1929, *M. Sachokia* (BAK) non vidi.

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag.* Iran 2: plate 76 (habit); - pages 217 (indument of peduncle and pods) and 226 (flower dissection).

Plants ca. 12-15 cm tall, acaulescent or with a short stem up to 4 cm long. Stipules 6-7 mm long, lanceolate, pilose, at a length of 1-2 mm adnate to the petiole and shortly jointed to one another. Leaves ca. 8-9 cm long, petiole short, 1-2 cm long, both petiole and rachis densely covered with short appressed hairs. Leaflets 12-15 pairs, elliptic or ovate, obtuse at the tip, ca. 7-8 mm long and 3-4 mm broad, upper side glabrous, ciliate at the margin and pilose on lower side along the mid-vein. Inflorescence a spike, peduncle ca. 6-8 cm long, covered with appressed black and white hairs, flowers numerous, nearly sessile. Bracts 5-7 mm long, linear, covered with black and white hairs. Calyx tubular, ca. 10 mm long, green or pale violet, covered with black and white hairs, the teeth setaceous or subulate, 3-4 mm long. Corolla blue or violet. Standard ca. 20 mm long, the limb rhomboid, ca. 8 mm broad, ligulate-attenuate towards the apex, emarginately tipped or shortly bilobate, at the base near the claw abruptly constricted. Wing-petals ca. 18 mm long, the limb elliptic, round-tipped, at the base auriculate, claw equaling the limb. Keel ca. 15 mm long, the limb oblique-elliptic, towards the tip shortly curved, claw equaling the limb. Pods shortly stipitate, ovoid, ca. 10 mm long and 5 mm broad, ventrally carinate, dorsally deeply sulcate, at the tip rostrate, densely covered with long silky hairs, mixed with short patent white hairs, fully bilocular.

Note: New record from Iran.

Specimens seen:

Azarbayejan: 33 km to Shahpur on road from Khoy, 1500 m, 30.6.1978, *Assadi & Mozaffarian 30492* (TARI); 12 km on the road from Salmas to Khoy (Ghareh tappeh) 1550 m, 28.6.1986, *Maassoumi & Abouhamseh 57038* (TARI); Salmas Ghooshehi pass, 1530-1800 m, 5.7.1976, *Amini*

6985 (TARI); 25 km E of Uroumieh, Chiehlu, 1320 m, 25.5.1982, *Akbarzadeh 41133* (TARI); 27 km from Salmas to Uroumieh (Ghosh-Chi neck), 1650 m, 26.6.1986, *Maassoumi & Abouhamzeh 57006, 57005* (TARI); Uroumieh, Sir Mou-Heydarlu, 19.5.81, *Tarighi & Amini 2917* (TARI); 38 km S Rezaieyeh, Darreh-Ghasemlou, 1500-1650 m, *Matin & Danesh-Pajouh 38398* (EVIN); Between Shahpur and Rezaieh, 1500-1700 m, 12.6.1977, *Moussavi & Tehrani 36802* (EVIN); 38 km S Rezaieyeh, Darreh-e Ghasemlou, 1500-1650 m, 3.6.1978, *Matin & Daneshpajouh 38398* (EVIN); Mianeh to Khalkhal, ca. 32 km on the road from Hendelan to Yal-Gheshlagh, 1550 m, 27.5.1987, *Maassoumi 64902* (TARI); ca. 24 km on the road from Mianeh to Gharah-Chaman, 1350 m, 26.5.1987, *Maassoumi 64889* (TARI); ca. 18 km on the road from Mianeh to Gharah-Chaman, 1300 m, 25.5.1987, *Maassoumi 64881, 64883* (TARI); Zanjan, between Toghai and Mianeh, 1450 m, 26.5.1987, *Maassoumi 64876* (TARI); on the old road from Gharah-Chaman to Torkeman-Chay, 1800 m, 26.5.1987, *Maassoumi 64894* (TARI); W Rezaieyeh, valley NW of Silvana village, 1500-1600 m, 22.5.1976, *Runemark & Foroughi 19676* (TARI); Sarab, Ghariyeh Mir Kouh-Hadji, 1700-1900 m, *Termeh & Danesh-Pajouh 41363* (EVIN).

25. *Astragalus macrourus* group

Plants scapose, acaulescent. Peduncle much longer than the leaves. Flowers yellow. Standard ligulately attenuate toward the apex. Pods ovaloid, sessile.

Astragalus macrourus, *A. eugenii*, *A. elegans*.

59. *Astragalus macrourus* Fisch. & C.A.Mey., Bull. Soc. Imp. Naturalistes Moscou 11: 346. 1838. **Typus:** pr. Tatuni in tr. Suwant, *Hohenacker* (LE) non vidi.

Fig.: MAASSOUMI, A.A., 1990, Illustr. guide gen. Astrag. Iran 1: plate 88 (habit); - pages 217 (indument of peduncle and pods) and 226 (flower dissection).

Plants acaulescent, glaucous, densely covered with short appressed, silvery hairs. Caudex much divided. Stipules lanceolate triangular, acuminate, rugose, pilose, at a length of 3-4 mm adnate to the petiole. Leaves 10-25 cm long, petiole 2-6 cm long, both petiole and rachis densely covered with white appressed hairs. Leaflets 17-25 pairs, oblong-elliptic, obtuse or sometime acute, both sides covered with appressed hairs, ca. 8-15 mm long and 3-8 mm broad. Inflorescence ovate or oblong, becoming cylindrical in fruit, ca. 3-10 cm long, peduncle 8-20 cm long, covered with short white, subappressed hairs, below the spike densely mixed with black hairs. Bracts acuminate, ca. 5-7 mm long, densely hairy. Calyx tubular, 10-14 mm long, covered with black and white hairs, the teeth subulate or linear, ca. 2-4 mm long. Corolla greenish yellow (in vivo). Standard 20-24 mm long, the limb rhomboid, ca. 9 mm broad, emarginate at apex. Wing-petals ca. 18 mm long, rounded at apex, at the base auriculate, auricle ca. 1 mm long. Keel ca. 16 mm long, the limb oblique-elliptic. Ovary pilose, sessile. Pods ovoid, ca. 12 mm long and 6 mm broad, terminating in a long recurved beak ca. 4 mm long, ventrally appanate and slightly carinate, dorsally deeply sulcate, densely covered with long white hairs mixed with short spreading white hairs, fully bilocular.

Specimens seen:

Kordestan: Kharaka station, N of Sanandaj, 40 km from Sanandaj, 2100 m, 14.5.1986, *Khaledian 1131* (TARI); *ibid. Massoumi (s.n.)* (TARI); around Sanandaj, 1900-2000 m, *Khaledian 2542* (TARI); Mahmara village, ca 20 km NW of Marivan, 1520 m, 11.5.1986, *Fattahi & Khaledian 563* (TARI); 33 km NW Divandareh, 2100 m, 29.6.1974, *Rechinger 48581* (W).

Hamadan: Ca. 41 km from Kangavar to Hamadan, 2200 m, 9.5.1987, *Maassoumi & Mirhosseini 59323* (TARI); ca. 11 km on the road from Songhor to Kangavar, 2000 m, 9.5.1987, *Maassoumi &*

Mirhosseini 59306 (TARI); Avadj, Sultan-Bulagh mts. 2000-2400 m, 12.5.1989, *Maassoumi & Mirhosseini 59389, 59390* (TARI).

Azərbaycan: W of Rezayeh, Targavar valley, W of Aubi village, 1900 m, 23.5.1976; pass, ca. 20 km S of Ahar on the road to Tabriz, 1700-1800 m, 31.5.1978, *Wendelbo & Assadi 27934* (TARI); W Rezayeh, Targevar valley, W of Aubi village, 1900 m, 23.5.1975, *Runemark & Foroughi 19774* (TARI); Meshginshahr, 1600 m, 25.5.1989, *Youssefy 2681* (Univ. Tabris).

Bakhtiari: Shahr-e Kurd, Ben, 2650 m, 12.6.1987, *Mozaffarian 62056* (TARI); Shahr-e Kurd, Baba-Heydar, Sefid-Daneh, 2380 m, 21.5.1986, *Mozaffarian 54358* (TARI); Chehel Dokhtaran Kuh, 2800 m, 2.6.1959, *Wendelbo 1742* (K).

Esfahan: Feridoun shahr, Posht kuh-Moghoei, between Sokan and Gorab, 2300 m, 20.5.1984, *Khajeddin & Sabzevari 2496* (TARI); Feridoun shahr, Meydanak, above Damdaran protected area, 2600 m, 25.5.1981, *Nowroozi 399* (TARI); Feridoun shahr, Meydanak, Sardab-e Dsofla, 2550 m, 25.5.1981, *Nowroozi 426* (TARI).

60. *Astragalus eugenii* Grossh. in Fl. USSR 12: 884. 1946. Holotypus: Caucasus Daghestan, prope Kurusch, *Becker* (LE) non vidi.

Fig.: MAASSOUMI, A.A., 1990, Illustr. guide gen. Astrag. Iran 1: plate 85 (habit); - pages 221 (indument of peduncle and pods) and 226 (flower dissection).

Plants acaulescent, ca. 60 cm tall. Stipules acuminate, ca. 16-18 mm long, at a length of 3-4 mm adnate to the petiole. Leaves 25-31 cm long, petiole 8-12 cm long, both petiole and rachis covered with appressed white hairs. Leaflets 20-21 pairs, ovate or elliptic, acuminate, 10-20 mm long and 5-8 mm broad, at the base cuneate, upper side glabrous or covered with appressed hairs toward the margin, lower side densely covered along the mid-vein or scattered toward the margin. Inflorescence a cylindrical spike ca. 17 cm long, peduncle longer than the subtending leaves, ca. 34 cm long, sulcate, covered with appressed white hairs or sometimes mixed with some scattered black hairs. Pedicel nearly absent. Bracts linear, 8-11 mm long, covered with black and white hairs. Calyx tubular, ca. 12-13 mm long, the teeth triangular, ca. 2 mm long, covered with appressed black and white hairs. Corolla yellow or violet. Standard ca. 22 mm long and 10 mm broad, rhomboid, ligulate-attenuate toward the apex, emarginately tipped or bilobate. Wing-petals ca. 19 mm long, the limb elliptic, shortly dilated toward the apex, round tipped, at the base auriculate, auricle ca. 1,5 mm long, the limb 1/2 times shorter than the claw. Keel ca. 7 mm long, the limb oblique-elliptic, curvate, 1/2 time shorter than the claw. Pods ovoid, ca. 10 mm long and 4 mm broad, ventrally carinate, dorsally appanate or slightly sulcate, densely covered with long soft yellowish hairs, mixed with short spreading white hairs, fully bilocular.

Notes: A new record from Iran.

Specimen seen:

Azerbaycan: Rezayeh, Targavar, 1750 m, 13.6.1972, *H. Foroughi 6258* (TARI).

61. *Astragalus elegans* Bunge in Mém. Acad. Imp. Sci. Saint Pétersbourg 11 (16): 55. 1868 in clave et l.c. 15 (1): 89. 1869. Syntypes: Persia Adserbidshan, prope Tabriz, *Szovits*; pr. Sseid-abbad, *Bunge & Bienert* (P!) ≡ *A. tabrisianus* E.Sheld., Minnesota Bot. Stud. 1: 154 (1894), nom. illeg.

Fig.: MAASSOUMI, A. A., 1990, *Illustr. guide gen. Astrag. Iran 1*: plate 83 (habit); - pages 221 (indument of peduncle and pods) and 226 (flower dissection).

Plants acaulescent, glaucous, densely villose, ca. 20-30 (-40) cm tall. Stipule triangular-acuminate, rugose, 10-12 mm long, pilose, at a length of 3-4 mm adnate to the petiole. Leaves ca. 10-20 cm long, petiole ca. 2-4 cm long, both petiole and rachis densely covered with long appressed hairs. Leaflets 20-30 pairs, ovate-oblong or narrowly elliptic, acute at apex, 8-15 mm long and 2-3 mm broad, upper side glabrous or rarely long villous, lower side densely villous. Inflorescence a spike 3-12 (-20) cm long, peduncle 10-20 cm long, deeply sulcate, densely covered with short appressed black and white hairs. Bracts linear, 5-7 mm long, with black and white hairs. Calyx tubular, ca. 14-15 mm long, covered with long white hairs mixed with short spreading hairs, the teeth subulate, ca. 3-4 mm long. Corolla greenish yellow or rarely purplish or violet. Standard 25-28 mm long, the limb rhomboid. ca. 7 mm broad, at the apex deeply emarginate or bilobed. Wing-petals 18-22 mm long, the limb oblong, dilated toward the apex, round-tipped. Keel 16-20 mm long, the limb triangular. Ovary sessile, pilose. Pods ovaloid, ca. 9 mm long and 4 mm broad, terminating in a curved beak 2-3 mm long, ventrally carinate, dorsally deeply sulcate, densely covered with long white hairs mixed with short spreading, black hairs, fully bilocular.

Notes: This species is very variable in of flower colour. Also the size of peduncle and spike varies to some extent.

Specimens seen:

Azarbayejan: Rezaiyeh to Shahpour, 18.5.1996, *Slotani & Kashkuli 6848* (EVIN); Tabriz to Ahar, 1800 m, 30.5.1971, *Rechinger (s.n.)* (W); Kalibar, Nabidjan, Doghroun mts., 2720 m, 26.6.1978, *Termeh, Moussavi & Habibi 38952* (EVIN); Ibidem, 2320-2750 m, 27.6.1987, *Termeh, Moussavi & Habibi 38948* (EVIN); Arasbaran protected area, mountains S of Kharil, 2000-2500 m, 9.6.1976, *Assadi & Maassoumi 2025* (TARI); Ibidem, between Kharil and Makidi, 2000 m, 29.5.1977, *Assadi & Vosoghi 24894 a* (TARI); 19-20 km from Ahar to Tabriz, 1600-1700 m, 24.6.1986, *Maassoumi & Abouhamzeh 56960* (TARI); 50 km from Tabriz to Payam to Mishudagh mts. 2000-2200 m, 25.6.1986, *Maassoumi & Abouhamzeh 56977* (TARI); Kalibar, Nabidjan, Doghroun mts. 2700 m, *Termeh, Moussavi & Habibi 38952* (EVIN); Maku to Khoy, mountains SW Kelisa kandi, 2400-2650 m, 29.6.1978, *Assadi & Mozaffarian 30309* (TARI).

26. *Astragalus eriopodus* group

Plants caulescent. Leaflets oblong elliptic. Inflorescence axillary. Bracts foliaceous. Corolla violet. Standard limb rhomboid. Pods stipitate.

Astragalus eriopodus, *A. vessalae*.

62. *Astragalus eriopodus* Boiss., *Diagn. Pl. Or. Nov. 2*: 48 (1843). **Syntypes:** Persia prov. Aderbidjan, *Aucher-Eloy 4408 & 4422* (K!).

= *A. stenostachys* Beck in *Denkschr. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl., 2. Abt. 51*: 333. 1886 = *A. eriopodus* Boiss. var. *stenostachys* (Beck) Sirj. & Rech.f.

= *A. eriopodus* Boiss. var. *longepedunculatus* Parsa, *Fl. Iran 9*: 28. 1966. **Holotypus:** W Arak, 22.3.1957, *Parsa ?* (K) non vidi.

Fig.: MAASSOUMI, A.A., 1990, *Illustr. guide gen. Astrag. Iran 1*: plate 84 (habit); - pages 217 (indument of peduncle and pods) and 226 (flower dissection).

Plants ascendent, ca. 25-50 cm tall, with developed stems. Stipules foliaceous, broadly ovate, ca. 16-18 mm long, covered with white hairs or mixed predominantly with black hairs, abruptly attenuated toward the apex, at a length of 1-2 mm adnate to the petiole and free from one another. Leaves 8-22 cm long, petiole very short, ca. 1-1,5 cm long, together with the rachis vested with white spreading hairs or sometimes mixed with scattered black hairs. Leaflets 9-12 pairs, oblong-elliptic, 10-25 mm long and 4-10 mm broad, upper side glabrous or with scattered hairs toward the margin, lower side covered with appressed hairs. Inflorescence a spike, peduncle ca. 7-8 cm long, covered with long soft hairs, mixed with short spreading white hairs or with black and white hairs. Bracts linear, ca. 10-12 mm long, vested with black and white hairs. Calyx tubular, 11-16 mm long, purplish, covered with spreading white hairs or mixed with some black hairs, the teeth subulate, 2-6 mm long. Corolla violet. Standard 18-25 mm long, the limb rhomboid, 8-10 mm broad in the middle part, ligulate-attenuate toward the apex, emarginately tipped or bilobate. Wing-petals 16-18 mm long, the limb narrowly elliptic, rounded at apex, at the base distinctly auriculate, equaling the claw. Keel 14-17 mm long, the limb oblique elliptic or curved, shorter than the claw. Ovary pilose, with a stipe ca. 3 mm long. Pods with a stipe ca. 4 mm long, ellipsoid, ca. 12-13 mm long, ventrally carinate, dorsally sulcate, covered with long, soft, white hairs mixed with short spreading black hairs, fully bilocular.

Specimens seen:

Azərbaycan: Between Zanjan to Mianeh, 1200 m, *Sabeti 15643* (TARI); Between Zanjan to Mianeh, 1200-1800 m, 10.5.1973, *Sabeti 15442* (TARI); Mianeh to Zanjan (Khorabad), 1000 m, 3.7.1973, *Sabeti 15062* (TARI); Urmīyeh, Mahabad road, 23.7.1974, *Siami 5330* (TARI), Urmīyeh, Golamz village, 16.5.1981, *Tarighi & Farbodnia et al. 1335* (TARI); Urmīyeh, Ghoyondaghi, 22.5.1971, *Siami 5405* (TARI); Urmīyeh, Talatappeh road, 23.5.1981, *Tarighi & Amini 1341* (TARI); Urmīyeh lake road Bizu village, *Tarighi & al.* (TARI); Hills S of Tabriz, 14.6.1928, *Gilliat-Smith 2269* (K).

Tehran: Arak, Tafresh, Valadabad, 1800 m, 8.6.1974, *Amini & Bazargan 18705, 18706* (TARI); 7 km from Khomain to Golpayegan, 1810 m, 18.5.1979, *Babakhanlou & Dini 8849* (TARI); 103 km from Hamadan on the road to Ghazvin, 2170 m, 26.6.1974, *Assadi & Shirdelpur 13205* (TARI); between Arak and Khomain, Varche village, 2050 m, *Mozaffarian & Massoumi 48019* (TARI).

Hamadan: Avadje, Sultan-Bulagh, mts., 2000-2400 m, 12.5.1987, *Maassoumi & Mirhosseini 59378* (TARI); Ab-e garm, Asiab to Ildorejin, 1700-2200 m, 15.6.1978, *Massoumi & Mirhosseini 59416* (TARI).

63. *Astragalus vessalae* Maassoumi & Podlech in Iran. J. Bot. 4: 88. 1988. Holotype: Tehran, ca. 71 km of Kazvin, near Noudehak, 1250 m, *Moussavi & Amini 15370* (TARI!).

Fig.: MAASSOUMI & PODLECH, l.c.: 89 (habit); MAASSOUMI, A.A., 1990, *Illustr. guide gen. Astrag. Iran 1*: plate 95 (habit); - pages 221 (indument of peduncle and pods) and 227 (flower dissection).

Plants ca. 30 cm tall, caulescent. Stem ascendent, ca. 25 cm long and 5 mm thick, covered with short hairs 0.8-1 mm long, internodes of stem ca. 6 mm long. Stipules greenish, deltoid, 10-12 mm long, ciliate at the margin or pilose towards the tip, at a length of ca. 2-3 mm adnate to the petiole and free from one another. Leaves 12-16 cm long, petiole 2-5 cm, long, both petiole and rachis sulcate, hairy. Leaflets 7-9 pairs, elliptic or obovate, 10-16 mm long and 7-

12 mm broad, at the tip rounded or slightly emarginate, upper side glabrous or with scattered subpatent hairs, lower side densely covered with appressed hairs. Inflorescence axillary, a dense spike, peduncle ca. 10 cm long, covered with white hairs or mixed with black hairs, flower numerous. Bracts membranous, linear, ca. 5 mm long, pilose. Calyx 12 mm long, tubular, densely covered with spreading hairs ca. 1,5 mm long, the teeth subulate, ca. 4 mm long. Corolla violet or blue. Standard ca. 17 mm long, the limb narrowly rhomboid, ca. 7 mm broad, at the tip incised or bilobate, at the base narrowly cuneate. Wing-petals ca. 15 mm long, the limb oblong, at the tip slightly emarginate, at the base auriculate, auricle ca. 1 mm long, the claw two times longer than the limb. Keel ca. 14 mm long, the limb oblong, curved, the tip rounded, the claw 1,5 times longer than the limb. Ovary pilose, shortly stipitate, stipe ca. 1 mm long.

Specimen seen:

Tehran: Ca. 71 km of Kazvin, near Noudehak, 1250 m, *Moussavi & Amin 15370* (TARI).

27. *Astragalus macrostachys* group

Plants caulescent, with developed stem. Leaflets linear. Inflorescence an axillary spike. Flowers violet. Standard rhomboid, ligulately attenuate toward the apex. Pods stipitate.

Astragalus macrostachys, *A. pseudomacrostachys*.

64. *Astragalus macrostachys* DC., Prodr. 2: 286. 1825. **Typus:** Armenia, *Tournefort* (non vidi).

= *A. shahpouricus* Parsa, Fl. Iran 9: 29. 1966. **Typus:** Azarbayejan: Alpin region of NW Shahpoor, 25.5.1957 (K!).

Fig.: MAASSOUMI, A.A., 1990, Illustr. guide gen. Astrag. Iran 1: plate 89 (habit); - pages 217 (indument of peduncle and pods) and 226 (flower dissection).

Plants with developed stem, 30-45 cm tall. Stipules triangular-acuminate, ca. 6 mm long, in lower part glabrous, upper part densely covered with black and white hairs or sometimes exclusively covered with black hairs, at a length of ca. 2 mm adnate to the petiole. Leaves 10-13 cm long, petiole very short, ca. 1-2 cm, densely vested with appressed hairs or predominantly mixed with black hairs. Leaflets 13-14 pairs, linear, complicate, 10-20 mm long and 2-4 mm broad, both sides covered with appressed hairs. Inflorescence axillary, a dense spike 5-15 cm long, elongating in fruit, peduncle equaling or slightly longer than the leaves, 7-20 cm long densely covered with short appressed white hairs or below the inflorescence mixed with short black hairs. Bracts linear, ca. 2 mm long, with black and white hairs. Calyx tubular, ca. 8 mm long, covered densely with black and white hairs, the teeth setaceous, 2-3 mm long. Corolla dark violet. Standard rhomboid, ca. 16 mm long, ca. 4-5 mm broad, ligulate-attenuate toward the apex, emarginately tipped or bilobate. Wing-petals ca. 15 mm long, the limb elliptic, round tipped, with an auricle ca. 1 mm long, equaling the claw. Keel, ca. 14 mm long, the limb oblique-elliptic, ca. 1,5 times shorter than the claw. Ovary pilose, stipitate, stipe ca. 2 mm long. Pods with a stipe ca. 6 mm long, ellipsoid, ca. 16-18 mm long, ventrally carinate, dorsally sulcate, terminating in a subulate beak, ca. 4 mm long, vested with long white or yellowish hairs, densely mixed with short spreading black hairs, fully bilocular.

Notes: The specimen *Rechinger 41790* with the yellow corolla and very short flowers seems to be a separate taxon.

Specimens seen:

Azarbayejan: 33 km to Shahpur on road from Khoy, 1500 m, 30.6.1978, *Assadi & Mozaffarian 30497* (TARI); 43 km from Tabriz to Marand (before Payam), 1650 m, 26.6.1986, *Maassoumi & Abouhamzeh 56983* (TARI); 30 km after Makou on road to Borolan, 1650 m, 28.6.1982, *Akbarzadeh & Salari 41179* (TARI); 24 km from Khoy on the road to Ghara Tappeh, 1550 m, 13.6.1972, *H. Foroughi 6253* (TARI); 27 km from Salmas to Uroumieh (Ghosh-Chineck), 1650 m, 26.6.1986, *Maassoumi & Abouhamzeh 57011* (TARI); 15-22 km from Khoy to Salmas, 1340 m, 26.6.1986, *Maassoumi & Abouhamzeh 56992* (TARI); Uroumieh, 6 km from Roshan diviation (after Silvana), 1630 m, 27.6.1986, *Maassoumi & Abouhamzeh 57029* (TARI); Uroumieh, Gushchi pass, 6.8.1982, *Sianii 5306* (TARI); Khoy, Gharah-Tappeh, 1500 m, 10.6.1975, *Amini 1548, 1448, 1556* (TARI); Khoy, ghotur road habash, 2400 m, 15.6.1975, *Amini 1557* (TARI); Uroumieh, Ghasemlu valley, 25.6.1972, *Sabeti 5335* (TARI); Near Khoy, Haji Aldin mountain, 1450-1850 m, 30.6.1978, *M. Assadi & V. Mozaffarian 30422* (TARI); 30 km S Khoy, versus Shahpur, 1500 m, 12.6.1971, *Rechinger 41790 ?* (W).

65. *Astragalus pseudomacrostachys* Maassoumi sp. nov.

Holotypus: Azarbayejan: Rezaiyeh, Ile de Kaboudan, 4.6.1978, 1300-1600 m, *Matin & Daneshpajouh 38378* (EVINI!).

Similar to *A. macrostachys* DC. but it differs in having short sessile ovaloid fruits, (not ellipsoid, long stipitate). Standard rhomboid, subacute (not ligulate-attenuate), stem densely covered with short appressed hairs (not glabrous).

Fig.: MAASSOUMI, A.A., 1993, *Illustr. guide gen. Astrag. Iran 2*: plate 91 (habit); - pages 220 (indument of peduncle and pods) and 226 (flower dissection).

Plantae perennes, caulescentes, ca. 30 cm altae, caule ca. 5-11 cm longo. Stipulae lanceolatae, acuminatae, ca. 10 mm longae, albi-nigri-pilosae, basi per ca. 2 mm petiolo adnatae, inter se connatae. Folia 8-18 cm longa, petiolo 3-5 cm longo, sicut rachis sparse longe et brevissime appresse piloso. Foliola 12-15 juga, anguste elliptica, 7-9 mm longa et 3-4 mm lata, supra in parte mediano glabra, marginem versus sparse pilosa, subtus appresse pilosa. Inflorescentiae axillares, elongatae, pedunculo ca. 14 cm longo, appresse piloso suffultae. Bracteeae 6-8 mm longae, lineares, albi-nigri-pilosae. Calyx 12-13 mm longus, albi-nigri-pilosus, dentibus linearibus ca. 3 mm longis. Corolla flava. Vexillum ca. 21 mm longum, lamina rhomboida, breviter ligulata, apice rotundatum. Alae ca. 18 mm longae, lamina anguste elliptica, antice rotundata, basi auriculata ca. 1 mm longa provisa. Carina 15 mm longa, lamina triangulare. Ovarium pilosum. Legumen ovoideum, sessile, ca. 8 mm longum et 4 mm latum, apice rostratum, rostro curvato ca. 3 mm longo, ventre carinatum, dorso applanatum, longe et brevissime patenter pilosum, complete biloculare.

28. *Astragalus podocarpus* group

Plants caulescent, with developed stem. Leaflets linear. Inflorescence an axillary spike. Flowers yellow. Standard obovate. Pods stipitate.

Astragalus podocarpus.

66. *Astragalus podocarpus* C.A. Mey., Verz. Pfl. Cauc.: 142. 1831. **Typus:** Talysch, in campis et agris montosis provinciae Talysch prope pagum Suwant, *C.A. Meyer* (LE) non vidi.

= *A. podocarpus* C.A.Mey. var. *leucotrichus* Bornm. & Gauba in Repert. Spec. Nov. Regni Veg. 39: 100. 1935. **Typus:** Persia borealis: Montes Elburs Centralas; in valle fluvii Keredj prope Sirah, 2300 m, *Gaubá* 625 (non vidi).

Fig.: MAASSOUMI, A.A., 1990, Illustr., guide gen. Astrag. Iran 1: Plate 91 (habit); - pages 217 (indument of peduncle and pod) and 226 (flower dissection).

Plants caulescent, ca. 50-60 cm tall. Stipules small, 3-4 mm long, pilose, at the base free from the petiole and shortly jointed to one another. Leaves 7-8 cm long, petiole short, 1-2 cm long, petiole and rachis densely covered with white appressed hairs or rarely mixed with some scattered black hairs. Leaflets 5-6 pairs, linear, ca. 25 mm long and 2 mm broad, acute at the tip, cuneate at the base, complicate, both sides covered with appressed hairs. Inflorescence dense, ovaloid or capitate, flowers numerous, peduncle ca. 7-8 cm long, covered with white hairs or sometimes mixed with black hairs. Calyx 6-8 mm long, tubular, covered with villous white and black hairs, the teeth subulate, ca. 2 mm long, Corolla yellow. Standard ca. 15 mm long, the limb obovate or orbicular, emarginately tipped or bilobed. Wing-petals ca. 13 mm long, the limb elliptic, dilated toward the apex, rounded at the tip or very rarely emarginate, at the base auriculate, claw equaling the limb. Keel ca. 11 mm long, the limb oblique-elliptic or curvate, claw equaling the limb. Ovary pilose, stipitate, stipe ca. 1 mm long. Pods with a stipe ca. 1 mm long, ovaloid, ca. 10 mm long and 3 mm broad, terminating in a recurved beak, ventrally rounded, dorsally sulcate, densely covered with long hairs, mixed with spreading short white hairs, fully bilocular.

Specimens seen:

Mazandaran: Kandavan, Chalus valley, 2780 m, 21.7.1971, *H. Foroughi* 2196 (TARI).

Azarbayejan: 40 km from Namin to Germi Pilleh-Chay region, neck mountain between Pillocho and Fatmeh Soul, 1900 m, 21.6.1980, *Nowroozi & Mozaffarian* 36418 (TARI); 45 km from Namin to Germi, 20.6.1980 *Mozaffarian & Nowroozi* 34613 (TARI); 2 km NE of Khalkhal, 1800-2050 m, 16.6.1980, *Mozaffarian & Nowroozi* 34058 (TARI); 78 km from Mianeh to Khalkhal (after Firouzabad), 1500 m, 20.6.1986 *Maassoumi & Abouhamzeh* 56893, (TARI); 28 km from Kivi, 8 km from Senjebid to Piraghaj, 1650 m, 17.6.1980, *Mozaffarian & Nowroozi* 34284 (TARI); Zanjan to Mianeh (Shur Qesh-Laq), 1000 m, 2.5.1973, *Sabeti* 15495 (TARI); 35 km from Ardabil to Germi, 21 km to Sadafarin region, 1650 m, 23.6.1986, *Maassoumi & Abouhamzeh* 56951 (TARI).

Hamadan: Kuh-e Alvand, 2700 m, *Assadi & Mozaffarian* 36816 (TARI).

III. Subsect. *Bornmuelleriana* (Sirj. & Rech.f.)Maassoumi, comb. nov.

= Sect. *Bornmuelleriana* Sirj. & Rech. f. in Repert. Spec. Nov. Regni Veg. 52: 15. 1943-
Lectotype: *A. anserinaefolius* Boiss. (PODLECH in Mitt. Bot. Staatss. München 29: 466. 1990).

Plants caulescent. Leaflets imbricate or complicate. Inflorescences axillary, densely spicate, or elongated. Bracts linear. Calyx campanulate or funnel-shaped, the teeth setaceous, as long or somewhat longer than the tube. Corolla violet or yellow. Standard elliptic. Pods elliptic, densely lanate.

29. *Astragalus anserinaefolius* group

Plants caulescent or nearly acaulescent. Flowers violet or yellow. Calyx teeth setaceous, as long as the tube. Standard limb oblong-elliptic.

Astragalus anserinaefolius, *A. laristanicus*, *A. termeanus*, *A. ghahrmanii*.

67. *Astragalus anserinaefolius* Boiss., *Diagn. Pl. Or. Nov.* 2: 76. 1843; **Type:** In desertis sinum persicum, *Aucher-Eloy 4410* (FI!, W!).

= *A. kermanicus* Parsa, *Fl. Iran* 9: 113. 1966. **Holotype:** Kerman, 28.7.1957, *Parsa* ? (K!).

Fig.: Maassoumi, A. A., (1990) *Illus Guide Gen. Astrag. Iran*, vol. 1, Plate 79 (habit); - pages 217 (peduncle and pod indumentum) and 226 (flower dissection).

Plants 10-35 cm tall, with developed stems. Stipules ca. 2-3 mm long, pilose, free from one another and the petiole. Leaves ca. 3 mm long, petiole 0.5-1 cm, both petiole and rachis covered with appressed or subpatent hairs. Leaflets 9-10 pairs, contiguous, complicate, obovate, ca. 5 mm long and 4 mm broad, both sides covered with appressed hairs. Inflorescences axillary, spherical or elliptic in flowering, elongated in fruit, flowers numerous, peduncle ca. 7 cm long, covered with short appressed hairs. Bracts linear, ca. 2 mm long, pilose. Pedicels ca. 1 mm long, pilose. Calyx campanulate or shortly tubular, at the base gibbous, ca. 10 mm long, covered with white hairs, rarely with some scattered black hairs, the teeth subulate, ca. 5 mm long. Corolla yellow or pale violet. Standard ca. 14 mm long, the limb elliptic, emarginate at apex. Wing-petals ca. 12 mm long, the limb narrowly elliptic, dilated toward the apex, round-tipped, at the base auriculate, equaling the claw. Keel ca. 11 mm long, the limb oblique-elliptic, equaling the claw. Ovary pilose, sessile. Pods ca. 9 mm long and 4 mm broad, covered with spreading long soft white hairs, bilocular.

Specimens seen:

Esfahan: 37 km SE Nain, 1300 m, 11.5.1961, *Pabot 7088 (28545)* (TARI); 30 km SE of Nain, *Babakhanlou, 23043* (TARI).

Fars: 40 km SE Abadeh, 1900 m, 26.4.1961, *Pabot 5826 (28544)* (TARI); 33 km from Lar to Bastak, Mountains SE of the village Hormud, 800-1100 m, 17.4.1983, *Assadi & Sardabi 41835* (TARI).

Hormozgan: 28 km N Hajiabad, 1180 m, 6.5.1961, *Pabot 6768 (28546)*, (TARI).

Kerman: inter Saidabad (Sirdjan) et Jugum Cah Coughuk (Cafut), ca. 1700-1900 m, 6.5.1948, *Rechinger, Aellen, Esfandiari 3136* (W, Evin); between Mahan and Kerman, ca. 1900 m, 6.5.1977, *Assadi 23283* (TARI); inter Barsir et Kerman, 9.6.1960, *Dadashzadeh (28543)*, (TARI); 130 km from Bam on the road to Kerman, 2100 m, 5.5.1977, *Assadi 23234* (TARI); 27 km from Ahar to Yazd, 1500 m, 4.6.1986, *Assadi & Bazgosha 56466* (TARI); Darzin, 6 km on the road to Jiroft, 1450 m, 4.4.1975, *Foroughi 15903* (TARI); 20,4 km N of Hajiabad, 150 km S Sirjan, 1100 m, 6.5.1961, *Pabot 6742* (TARI); hills S of Deh-Bakri, 1150-1700 m, 1.5.1975, *Paris 75.262* (K); 55 km N of Ardestan, 15.5.1961, *Zohary & Orshan 60-4914* (HUJ).

68. *Astragalus laristanicus* Bornm. & Gauba in Feddes *Repert. Sp. Nov. Regni Veg.* 50: 157. 941. **Holotype:** Persia australis, Laristan, in steppis aridis inter Lar et Hormud, 700 m, *Gaub 941* (B) n.v.

= *A. kourosianus* Parsa in *Kew Bull.* 1947: 19 (1947); **Holotype:** Persia, Lar, Hormud, *Parsa 670* (Faculty of Pharmacy, Tehran!).

= *A. anserinaefolius* Boiss. var. *elegantifolius* Parsa, *Fl. Iran* 9: 38. 1966. **Lectotype:** Sirjan, III.- IV.1956, *Parsa* ? 200/0 (K!).

Fig.: Maassoumi, A. A., 1993, *Illus. Guide gen. Astragalus Iran*, vol. 2 plate 78 (habit); - pages 217 (peduncle and pods indumentum) and 226 (flower dissection).

Plants caulescent, 17-25 cm tall. Stipules ca. 8 mm long, lanceolate, covered with black and white hairs, abruptly attenuate towards the tip, at a length of ca. 2 mm adnate to the petiole and free from one another. Leaves ca. 5-6 cm long, petiole ca. 1-2 cm long, densely covered with short spreading hairs. Leaflets ca. 10 pairs, complicate, ovate, ca. 6 mm long and 2-3 mm broad, upper side glabrous or ciliate at the margin, lower side covered with appressed hairs. Inflorescence at first densely capitate, gradually becoming elongated, peduncle 7-8 cm long, covered with short appressed hairs, below the inflorescence mixed with black hairs. Pedicels 1-2 mm long, pilose. Bracts linear, ca. 7 mm long, covered with black and white hairs. Calyx tubular or campanulate, ca. 13 mm long, covered with black and white hairs, the teeth setaceous ca. 6 mm long. Corolla pink or violet. Standard ca. 18-19 mm long, the limb elliptic, at the apex emarginate, at the base near the claw constricted. Wing-petals ca. 16 mm long, the limb elliptic, round tipped, at the base auriculate, the claw slightly longer than the limb. Keel ca. 12-13 mm long, the limb elliptic, curved, the claw 1.5 times longer than the limb. Ovary pilose. Pods ca. 16 mm long and 5 mm broad, ventrally rounded, dorsally slightly sulcate, covered with long silky soft hairs, fully bilocular.

Specimens seen:

Hormozgan: ca. 100 km SE of Lar, near the village Sartang, 300 m, 19.4.1983, *Assadi & Sardabi 41942* (TARI); 111 km from Bandar-Abbas to Sirjan, after the tunnel, 1000 m, 21.4.1983, *Assadi & Sardabi 42223* (TARI).

Baluchestan: Sarbaz, 74 km Zabol road, 1280 m, 11.3.1974, *Foroughi 10790* (TARI).

69. *Astragalus termeanus* Maassoumi & Podlech in *Iran. J. Bot.* 4: 87. 1988.

Holotype: Baluchestan, 150 km S of Zahedan on road to Khash, 1500 m, 24.4.1983, *Termeh, Moussavi & Tehrani 41110-E* (Evin!; Iso: W!).

Plants with a branched caudex. Stems 2-6 cm long, covered with appressed white hairs. Stipules membranous or greenish, ca. 4-5 mm long, acute, triangular, free from one another, at a length of 1-3 mm adnate to the petiole, covered with isolated white hairs or mixed with black hairs. Leaves 4-10 cm, petiole 1-3 cm long, both petiole and rachis covered with appressed hairs 0.5-0.8 (-1) mm long, in the upper part with isolated hairs 1-2 mm long. Leaflets 8-12 pairs, elliptic, 4-11 mm long and 1.5-3 mm broad, at the tip acute, upper side glabrous or with scattered hairs, lower side covered with subpatent or appressed strigous hairs, leaflets complicate. Inflorescence axillary, capitate at first, elongate in fruiting, ca. 12 cm long with many flowers, peduncle 3-10 cm long, sulcate, in the lower part with white hairs and towards the upper part more and more mixed with black hairs. Bracts membranous, 6-10 mm long, subulate, covered with black and white hairs. Pedicels 1.5-2.5 mm long, with subpatent hairs. Calyx ca. 13-15 mm long, tubular, covered with spreading hairs, the teeth linear or subulate, greenish, 6-8 mm long, equaling the tube or slightly longer. Corolla pink or violet. Standard 16-21 mm long, the limb narrowly elliptic, 5-9 mm broad, round-tipped. Wing-petals 15-19 mm long, the limb narrowly oblong, round-tipped, at the base with a small auricle, claw equaling the limb. Keel 13-14 mm long, the limb triangular-elliptic, claw 1.5 times longer than the limb. Ovary shortly stipitate, pilose. Pods elliptic, ca. 10-12 mm long, 4.5-5 mm broad, and 4 mm high, ventrally carinate, dorsally sulcate, bilocular.

Specimens seen:

Baluchestan: Saravan, Mahouk, 9.4.1950, *Salavation 5599 E* (Evin); E of Khash, 28.3.1973, *Sojak 2125* (PR), 40 km W of Saravan, near suran, 30.3.1973, *Sojak 688* (PR); 31 km SW of Espakeh, 10.4.1973, *Sojak 1680* (PR); 5-10 km N of Khash, 1300 m, 25.4.1983, *Termeh, Moussavi & Tehrani 41113 E* (Evin); 18 km S of Khash, on the road to Iranshahr, 1320 m, 28.4.1983, *Termeh, Moussavi & Tehrani 41093 E* (Evin).

70. Astragalus ghahremanii Maassoumi & Podlech in Iran. J. Bot. 4: 76. 1988. **Holotype:** Baluchestan, Saravan to Dehak, 13.3.1974, *Iranshar 16344* (Evin!; Iso: W!).

Fig.: Page 226 (flower dissection).

Plants acaulescent or with a short stem, covered with more or less spreading hairs. Stipules greenish, 3-6 mm long, triangular, pilose, free from one another and shortly adnate to the petiole. Leaves 4-8 cm long, petiole equaling the limb or shorter, covered with appressed or subpatent hairs ca. 1,5 mm long. Leaflets 6-8 pairs, elliptic, 2-6 mm long, and 1,5-4 mm broad, at the tip obtuse, upper side toward the margin and lower side densely covered with appressed hairs. Inflorescence axillary, capitate at first, becoming loose in fruit and up to 10 cm long, peduncle ca. 6-9 cm long, pilose, flower numerous. Bracts ca. 3-4 mm, greenish, acuminate. Calyx ca. 12-13 mm long, tubular, covered densely with spreading hairs, the teeth linear or subulate, more or less equaling the tube. Corolla violet. Standard ca. 15-16 mm long, the limb elliptic, 7-9 mm broad, round tipped or slightly retuse or emarginate. Wing-petals 14-15 mm long, the limb elliptic, at the base auriculate, auricle ca. 1 mm long, claw equaling the limb. Keel ca. 11-12 mm, the limb oblique-elliptic or slightly curved, acute, at the base shortly auriculate, claw longer than the limb. Ovary sessile, pilose, style glabrous. Pods (immature) sessile, elliptic, ca. 10 mm long, covered with long strigous hairs.

Specimens seen:

Baluchestan: Saravan to Dehak, 13.3.1974, *Iranshahr & Ershad 1634 E* (Evin); 91 miles SE of Khash on the road to Sarvan 4000 ft., 17.3.1971, *Grey, Wilson & Hewer 190* (W).

Doubtful species

During this work *A. kendewanensis* Gilli, described as belonging to sect. *Malacothrix* was not seen. The description is incomplete, but according the field experience this taxon does not belong to the sect. *Malacothrix*. I suppose that this curious plant belongs to the the sect. *Alopecuroidei* DC. Perhaps this species is a young plant of *A. ajubensis* Bge. or *A. jesseni* Bunge, which are widely distributed in the central Albourz (Kendewan mountains).

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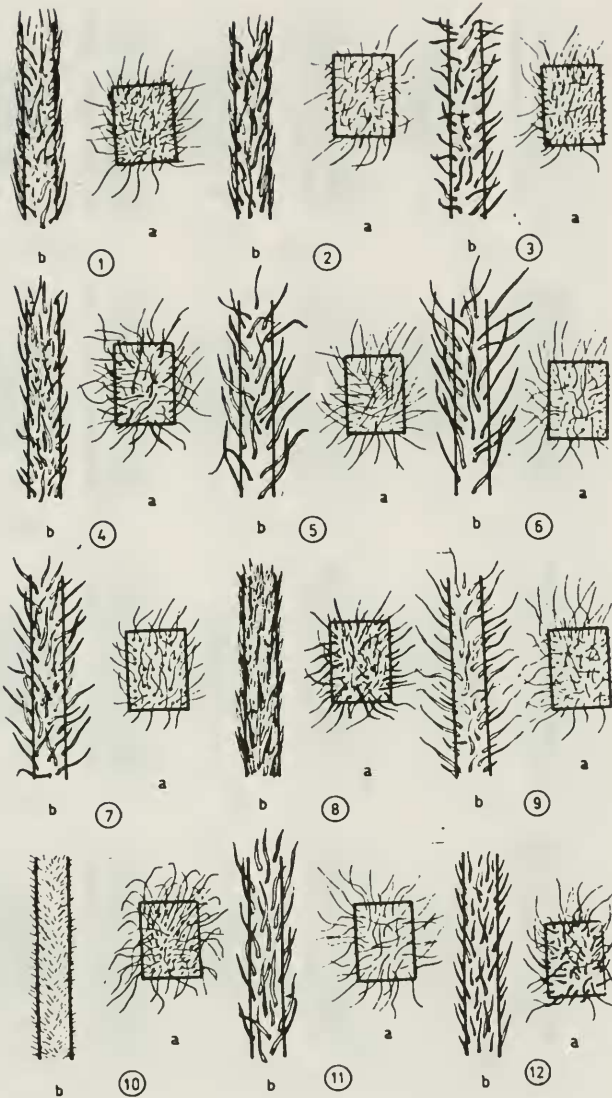


Fig. 1. Indument of pods (a) and peduncles (b)

1. *A. macrourus* (62056) - 2. *A. macrostachys* (57041) - 3. *A. eriopodus* (43134) - 4. *A. podocarpus* (2196) - 5. *A. senilis* (8515) - 6. *A. deickianus* (59384) - 7. *A. pulchellus* (17374) - 8. *A. spachianus* (39804) - 9. *A. chrysotrichus* (15541,74) - 10. *A. laristanicus* (41942) - 11. *A. anserinifolius* (41835) - 12. *A. kabristanicus* (57005)

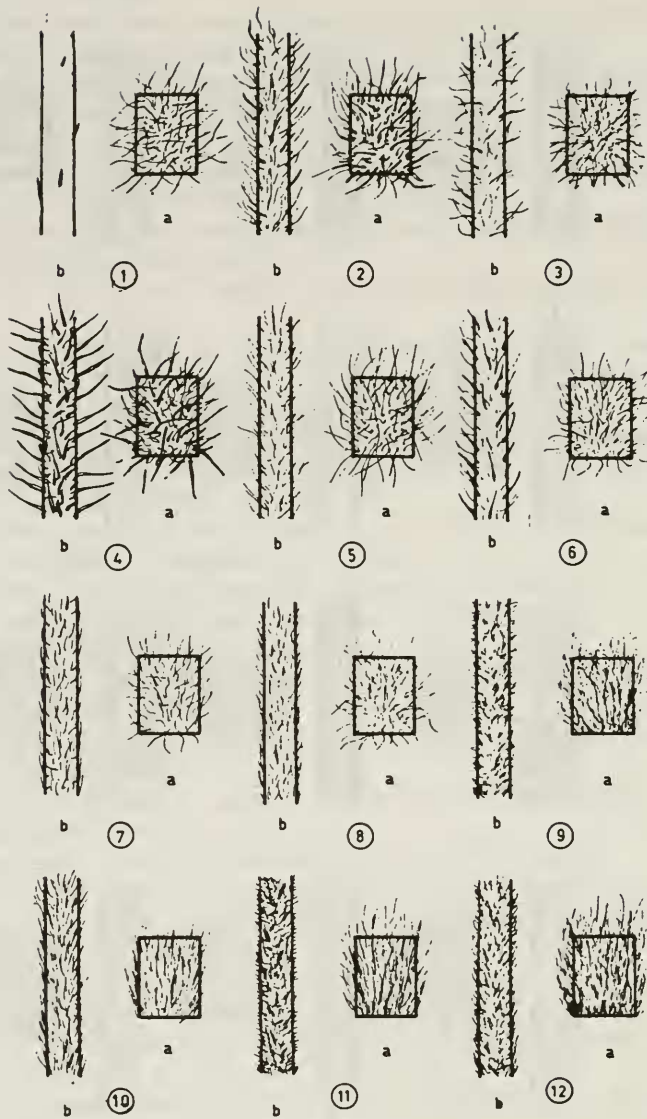


Fig. 2. Indumentum of pods (a) and peduncles (b)

1. *A. holopsilus* (62085) - 2. *A. heterodoxus* (58049) - 3. *A. griseus* (17691) - 4. *A. mollis* (47794) - 5. *A. rawlinsianus* (12873) - 6. *A. suluklensis* (50756) - 7. *A. takhtadzhani* (34164) - 8. *A. plebejus* (57394) - 9. *A. melanodon* (31226) - 10. *A. beckii* (32851) - 11. *A. tenuiscapus* (46164) - 12. *A. melanodon* (31241)

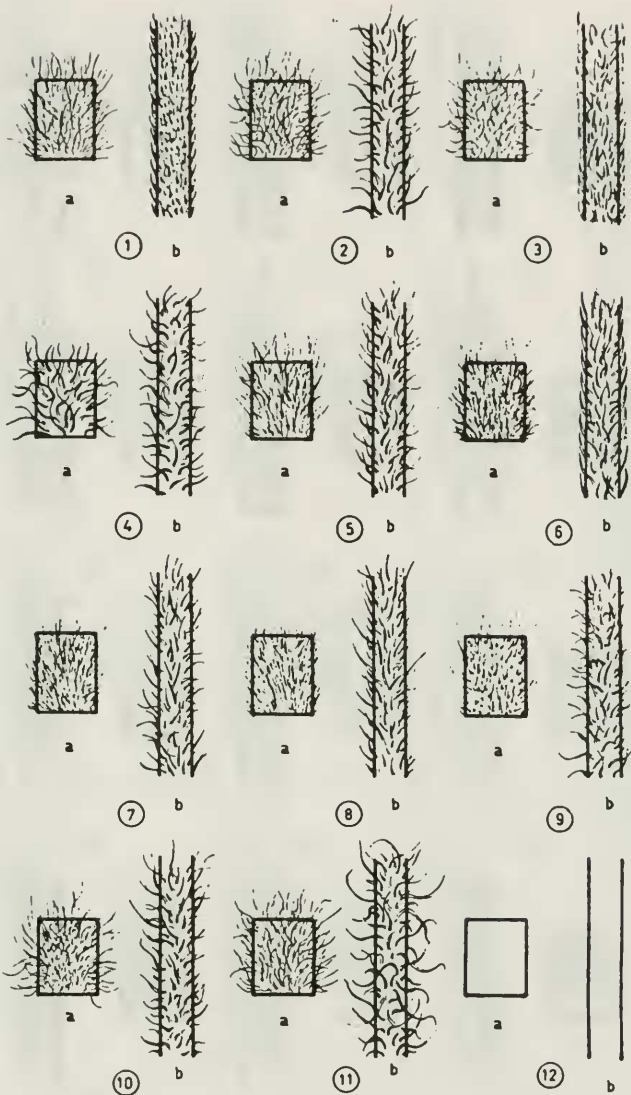


Fig. 3. Indumentum of pods (a) and peduncles (b)

1. *A. rudimentus* (Iso., s.n.) - 2. *A. belgheisensis* (Holo., 64843) - 3. *A. inclinatus* (Holo., s.n.) - 4. *A. rusticus* (Holo., 233) - 5. *A. patrius* (Holo., 51297) - 6. *A. babakhanloui* (Holo., 48083) - 7. *A. glochidiatus* (Iso., s.n.) - 8. *A. chahartaghensis* (Holo., 59968) - 9. *A. pseudopulchellus* (Holo., 48087) - 10. *A. inexpectatus* (Holo., 1287) - 11. *A. expectatus* (Holo., 45716)

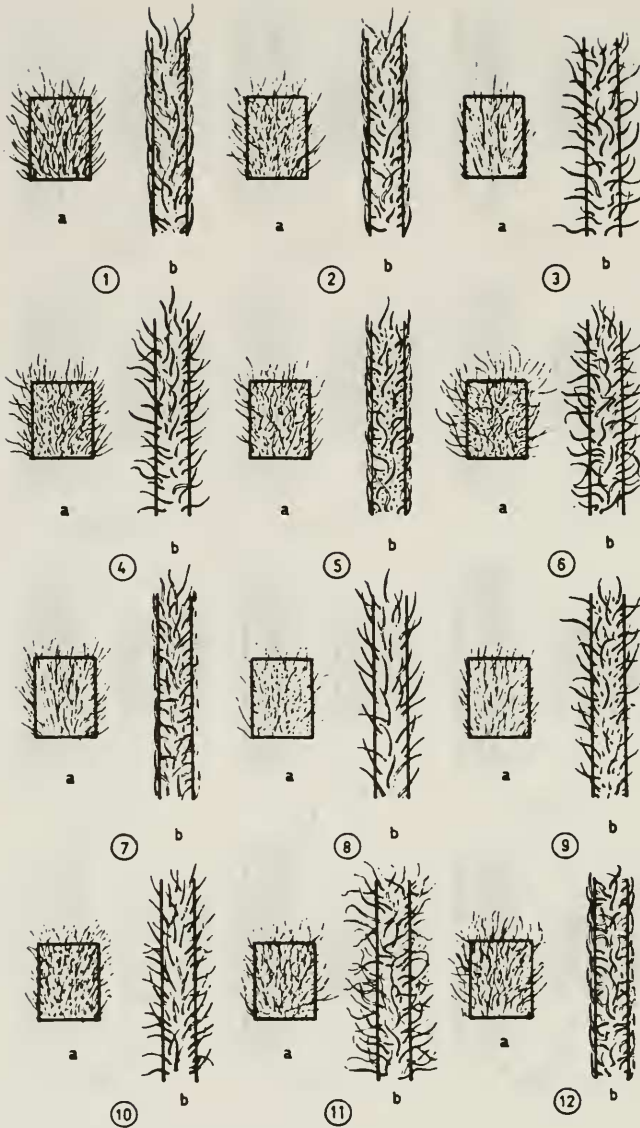


Fig. 4. Indumentum of pods (a) and peduncles (b)

1. *A. idomitus* (Holo., 30771) - 2. *A. galbineus* (Holo., 9692) - 3. *A. nahavandicus* (Holo., 59365) - 4. *A. rivashensis* (Holo., 35057) - 5. *A. daghdaghabadensis* (Holo., 64502) - 6. *A. hendelanicus* (Holo., 64907) - 7. *A. lippertii* (Holo., 6313) - 8. *A. pseudomacrostachys* (Iso., 38378) - 9. *A. leucothrichus* (Holo., 1026) - 10. *A. memnonius* (Holo., 8572) - 11. *A. canosus* (Holo., 11981) - 12. *A. leushanensis* (Holo., 60356)

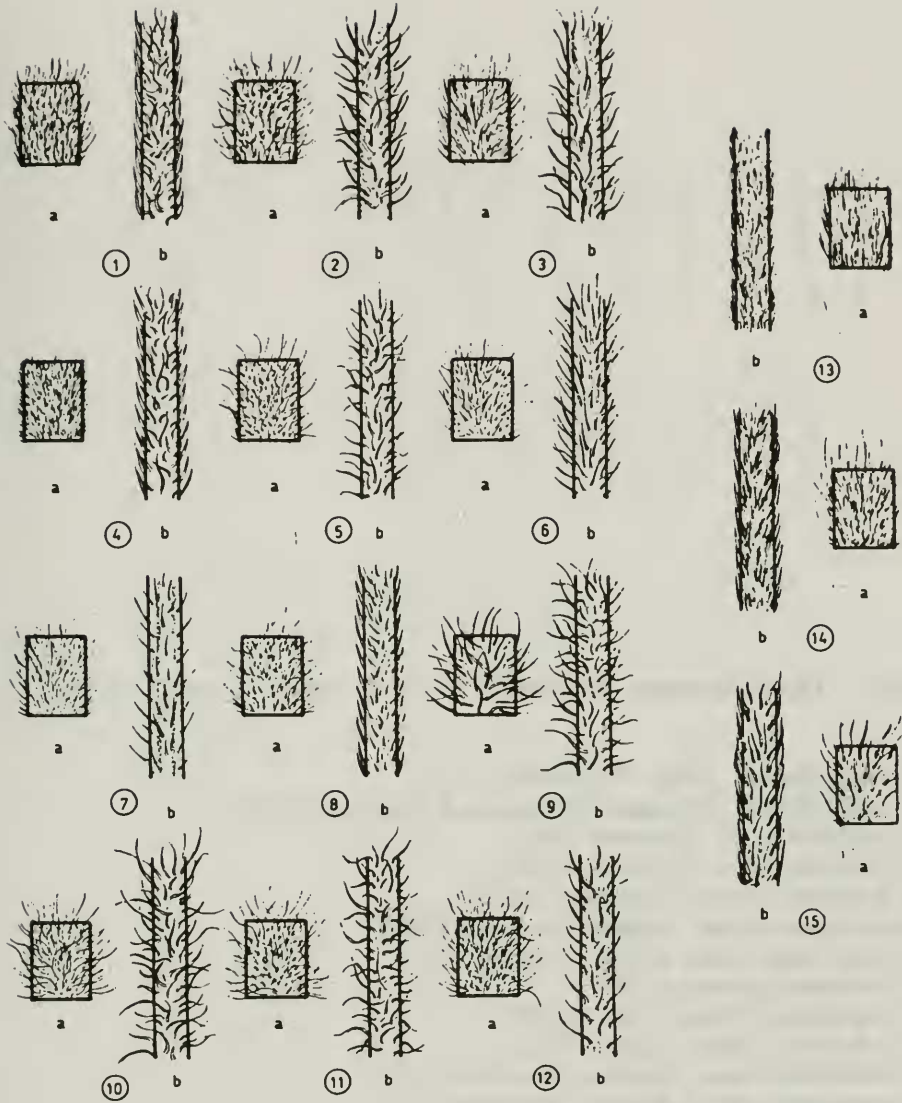


Fig. 5. Indumentum of pods (a) and peduncles (b)

1. *A. idoneus* (Holo., 27540) - 2. *A. caligineus* (Holo., 54709) - 3. *A. inoblitus* (Holo., 56963) - 4. *A. birangae* (Holo., 24) - 5. *A. pseudoantilibani* (Holo., 34491) - 6. *A. khajiboulaghensis* (Holo., 34683) - 7. *A. typhaeformis* (Holo., 13372) - 8. *A. alamouticus* (Holo., 51047) - 9. *A. vessalae* (Holo., 15370) - 10. *A. capillatus* (Holo., 54615) - 11. *A. perdurabilis* (Holo., 12872) - 12. *A. ghoortapacensis* (Holo., 4307) - 13. *A. pauperiflorus* (7496) - 14. *A. elegans* (56960) - 15. *A. eugenii* (6258)

Fig. 6. Flower dissections: A = standard; B = wing-petals; C = keel (. nat. size)

1. *A. senilis* Bornm. (Majda Zhumer 493)
2. *A. senilis* Bornm. (Khatamsaz, Maassoumi & Abouhamzeh 52104)
3. *A. pulchellus* Boiss. (Jacobson 6198)
4. *A. pulchellus* Boiss. (Foroughi 17374)
5. *A. deickianus* Bornm. (Maassoumi 59333).
6. *A. deickianus* Bornm. (Wendelbo & Assadi 16887)
7. *A. inexpectatus* Maass. & Podl. (Hol.)
8. *A. inclinatus* Maassoumi (Hol.)
9. *A. pauperiflorus* Bornm. (Riazi 7496)
10. *A. rudimentus* Maass. (Terme 13325E)
11. *A. melanodon* Boiss. (Assadi & Mozaffarian 31241)
12. *A. tenuiscapus* Frey. & Bornm. (Sojak 6454)
13. *A. griseus* Boiss. (Wendelbo & Foroughi 17691)
14. *A. holosemius* (Aucher Eloy 4418)
15. *A. beckii* Bornm. (Bornmüller 6770 Hol.)
16. *A. beckii* Bornm. (Maassoumi 55108)
17. *A. rusticus* Maass. (Hol. 233)
18. *A. patrius* Maass. (Assadi & Massoumi 51297, Hol.)
19. *A. plebejus* Boiss. (Riazi 9108)
20. *A. babakhanloui* Maass. & Podl. (Mozaffarian & Maassoumi 48083, Hol.)
21. *A. chahartaghensis* Maassoumi & Podl. (Mozaffarian 59968, Hol.)
22. *A. capillatus* Maassoumi (Mozaffarian 54615, Hol.)
23. *A. iranicus* Bge. (Th. Kotschy 297)
24. *A. iranicus* Bge. (Shahrud)

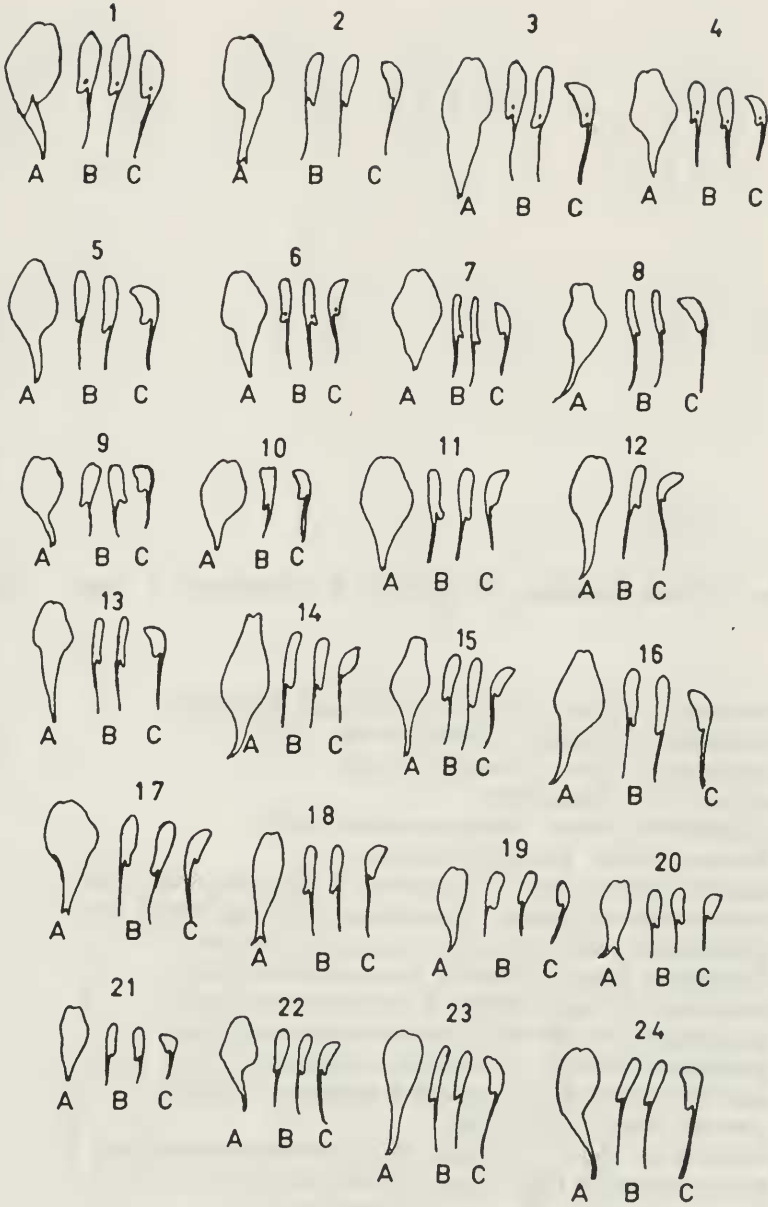


Fig. 7 Flower dissections: A = standard; B = wing-petals; C = keel (. nat. size)

1. *A. perdurabilis* Maass. (Wendelbo & Foroughi 12872, Hol.)
2. *A. ghootapacensis* Maass. (Nowroozi 4307, Hol.)
3. *A. glochidiatus* Maass. (Terme, s.n. Hol.)
4. *A. mollis* M.B. (Steven, ISO.)
5. *A. belgheisensis* Maass. (Maassoumi 64843, Hol.)
6. *A. birangae* Maass. (Youssefy 24, Hol.)
7. *A. pseudoantilibani* Maass. (Mozaffarian & Nowroozi 34491, Hol.)
8. *A. khajiboulaghensis* Maass. (Mozaffarian & Nowroozi 34683, Hol.)
9. *A. typhaeformis* Maass. (Wendelbo & Assadi 13372, Hol.)
10. *A. alamouticus* Maass. (Assadi & Maassoumi 51047, Hol.)
11. *A. leucothrichus* Maass. (Fattahi & Khaledian 1026, Hol.)
12. *A. memonius* Maass. & Podl. (Dini & Bazargan 8572, Hol.)
13. *A. takhtadzhani* Grossh. (Mozaffarian & Nowroozi, 34174)
14. *A. suluklensis* Freyn & Sint (Assadi & Maassoumi, 50372)
15. *A. canosus* Maass. (11981, Hol.)
16. *A. leushanensis* Maass. (Assadi & Shah-Mohammadi 60356, Hol.)
17. *A. idoneus* Maass. & Podl. (Assadi 27540, Hol.)
18. *A. caligineus* Maass. (Mozaffarian 54709, Hol.)
19. *A. inoblitus* Maass. (Maassoumi & Abouhamzeh 56963, Hol.)
20. *A. rawlinsianus* Aitch. & Baker (Maassoumi 47591)
21. *A. indomitus* Maass. (Arazm & Bazargan, 30771, Hol.)
22. *A. galbineus* Maass. (Riazi 9692, Hol.)
23. *A. nahavandicus* Maass. (Maassoumi & Mirhosseini 59365, Hol.)

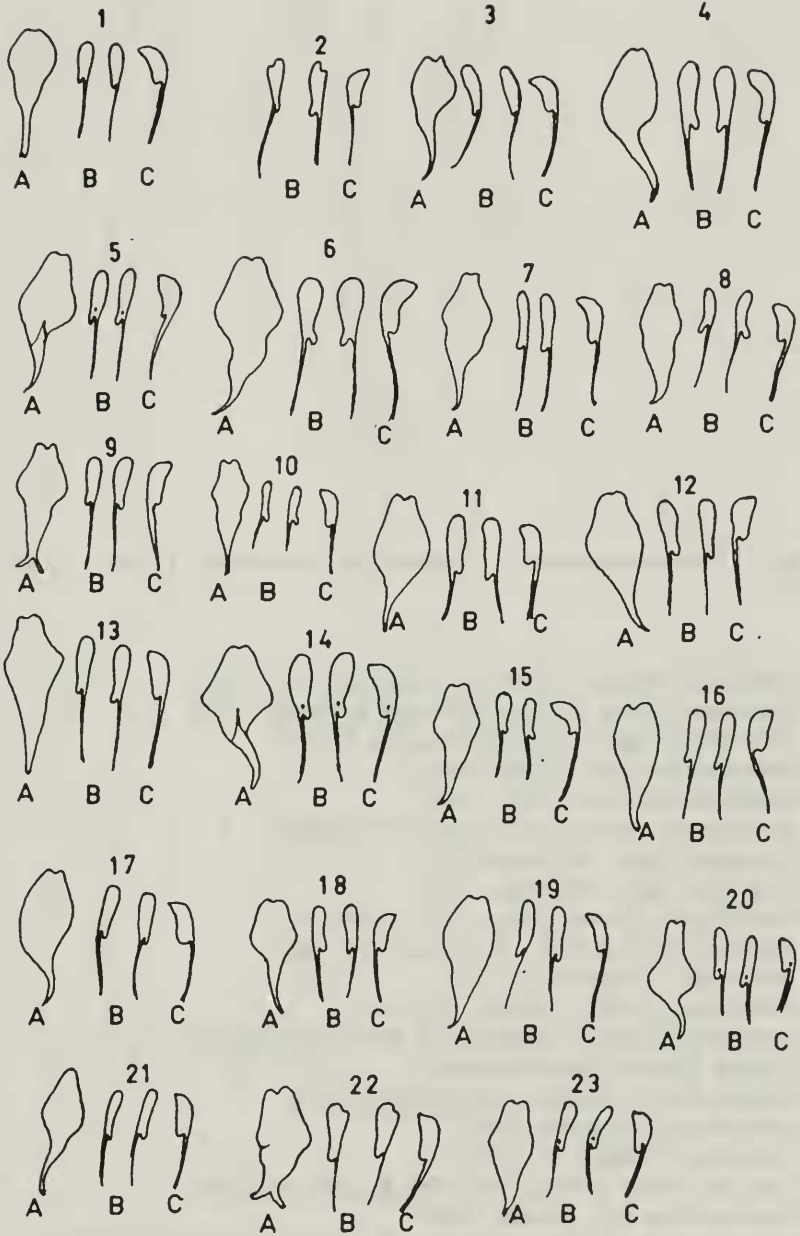
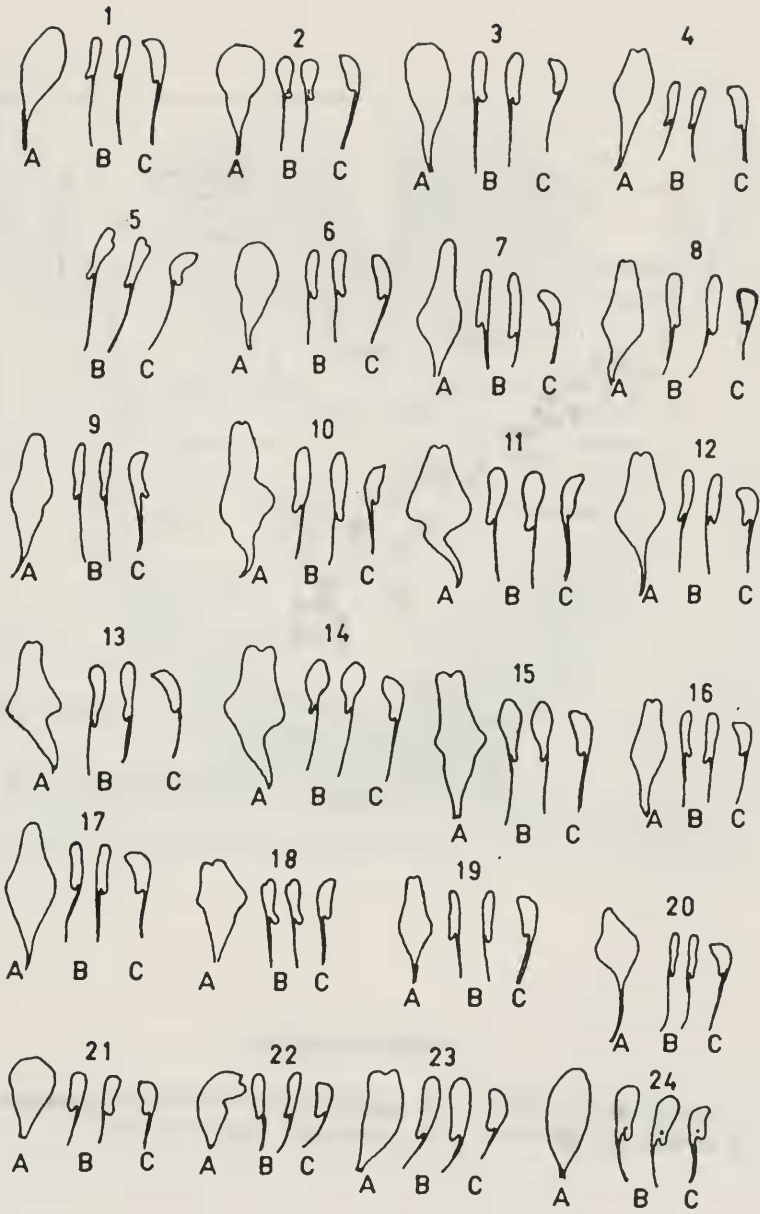


Fig. 8 Flower dissections: A = standard; B = wing-petals; C = keel (1/3 nat. size)

1. *A. rivashensis* Maass. (Assadi & Mozaffarian, 35657, Hol.)
2. *A. spachianus* Boiss. & Buhse (Foroughi & Assadi, 16216)
3. *A. heterodoxus* Bge. (Assadi & Bazgosha, 56148)
4. *A. chrysotrichus* Boiss. (ISO, 4414)
5. *A. daghdaghabadensis* Maass. (Hol.)
6. *A. hendelanicus* Maass. (Maassoumi 64907, Hol.)
7. *A. holopsilus* Bge. (Rechinger, 47387)
8. *A. holopsilus* Bge. (Nowroozi, 3722)
9. *A. kabristanicus* Grossh. (Maassoumi 64894)
10. *A. lippertii* Maass. & Podl. (Foroughi, 6313, Hol.)
11. *A. sarae* Eig (Akbarzadeh, 41133)
12. *A. macrorous* F. & M. (Aucher.-Eloy, 4417)
13. *A. macrorous* F. & M. (Maassoumi & Mirhosseini, 59311)
14. *A. eugenii* Grossh. (Foroughi, 6258)
15. *A. elegans* Bge. (Assadi & Mozaffarian, 30309)
16. *A. eriopodus* (Aucher Eloy, 4422)
17. *A. eriopodus* (Gilliat, Smith, 2269)
18. *A. vessalae* Maass. & Podl. (Moussavi & Amin 15370, Hol.)
19. *A. macrostachys* DC. (Sabeti, 5894)
20. *A. pseudomacrostachys* Maass. (Matin & Daneshpajouh 38378 E, Hol.)
21. *A. podocarpus* (Mozaffarian & Nowroozi, 34284)
22. *A. anserinifolius* Boiss. (Aucher Eloy, 4410, ISO.)
23. *A. laristanicus* Bornm. & Gauba (Manutchehri, 394)
24. *A. ghahremanii* Maass. & Podl. (ISO, 16344)





Distribution map of:

A. senilis ▲

A. melanodon ●

A. pulchellus ○

A. tenuiscapus ★

A. deickianus ■



Distribution map of:

A. holosemius ■

A. plebeius ●

A. babakhanloui ▲

A. chahartagensis ★



Distribution map of:

A. pauperiflorus ▲
A. rudimentus ■

A. beckii ●
A. griseus ○

A. aspadanus ★
A. saccatus ☆



Distribution map of:

A. mollis ▼

A. khajiboulaghensis ■

A. belgheisicus ●

A. typhaeformis *

A. suluklensis ○



Distribution map of:

A. iranicus ▲
A. ghoortapensis ■

A. perdurabilis ●
A. glochidiatus ★



Distribution map of:

A. rivashensis ●
A. chrysotrichus ○

A. spachianus ■
A. daghdaghabadensis ★

A. heterodoxus ▲
A. hendelanicus ★



Distribution map of:

A. rawlinsianus ▲
A. nahavandicus ☆

A. sarae *
A. galbineus ■

A. indomitus ●



Distribution map of:

A. idoneus ■
A. inoblitus ☆

A. caligineus ▲

A. leushanensis ●



Distribution map of:

A. holopsilus ●
A. macrourus ○

A. lippertii ▲
A. kabristanicus ■



Distribution map of:

A. laristanicus ●

A. termeanus ■

A. macrostachys ▲



Distribution map of:

A. elegans ▲
A. eriopodus ★

A. anserinifolius ●
A. podocarpus ■

Index

(new species are marked with *)

- Astragalus* L. sect. *Bornmuelleriana* Sirj. & Rech.f. 157, 161, 1212
- sect. *Caprini* DC. 157
 - sect. *Dasyphyllium* Bunge 158
 - sect. *Grammocalyx* Bunge 158
 - sect. *Heterozyx* Bunge 158, 161
 - sect. *Hypoglottidei* DC. 158
 - sect. *Malacothrix* Bunge 161
 - subsect. *Bornmuelleriana* (Sirj. & Rech.f.)Maass. 212 *
 - subsect. *Dasyphyloides* Maass. 166 *
 - subsect. *Malacothrix* 170
 - sect. *Stereothrix* Bunge 158
 - subgen. *Hypoglottis* Bunge 158
- Astragalus* *ahouicus* Parsa 181
- *alamouticus* Maass. 184, 188 *
 - *aligudarzicus* Parsa 169
 - *anserinaefolius* Boiss. 161, 212, 213
 - - var. *elegantifolius* Parsa 213
 - *aspadanus* Bunge 174, 176
 - *babakhanloui* Maass. & Podl. 178
 - *beckii* Bornm. 174, 175
 - *belgheisicus* Maass. 160, 184, 187
 - *birangae* Maass. 184, 190
 - *caliginus* Maass. 192, 193 *
 - *canosus* Maass. 191
 - *capillatus* Maass. 1586, 180 *
 - *chahartaghensis* Maass. & Podl. 178, 179
 - *chrysotrichus* Boiss. 160, 201
 - f. *lineatus* Parsa 181
 - *comosus* Bunge 184
 - *daghdaghabadensis* Maass. 202
 - *deickianus* Bornm. 158, 168, 169
 - *elegans* Bunge 206, 207
 - *eriocarpus* M.Bieb. 160, 184
 - *eripodus* Bunge 208
 - - var. *longepedunculatus* Parsa 208
 - - var. *stenostachys* (Beck) Sirj. & Rech.f. 208
 - *eugenii* Grossh. 160, 206, 207
 - *expectatus* Maass. 167
 - *galbineus* Maass. 196
 - *ghahremanii* Maass. & Podl. 213, 215
 - *ghoortapacensis* Maass. 181, 182
 - *glochidiatus* Maass. 183
 - *griseus* Boiss. 172, 173
 - - var. *viridis* Parsa 181
 - *hendelanicus* Maass. 203
 - *heterodoxus* Bunge 161, 200, 201
 - *hirtus* Bunge 158, 180
 - *holopsilus* Bunge 204
 - *holosemius* Bunge 174, 175
 - *idoneus* Maass. & Podl. 192
 - *inclinatus* Maass. 167, 168 *
 - *indomitus* Maass. 160, 195 *
 - *inexpectatus* Maass. & Podl. 167
 - *inoblitus* Maass. 192, 193 *
 - *iranicus* Bunge 160, 181
 - *kabristanicus* Grossh. 204, 205
 - *kendewanensis* Gilli 215
 - *kermanicus* Parsa 213
 - *khajiboulaghensis* Maass. 184, 187
 - *kourosianus* Parsa 213
 - *laristanicus* bornm. & Gauba 160, 213
 - *leucotrichus* Maass. 184, 188 *
 - *leushanensis* Maass. 192 *
 - *lippertii* Maass. & Podl. 204
 - *lisaricus* Maass. 174, 177 *
 - *macrostachys* DC. 160, 210
 - *macrourus* Fisch. & C.A.Mey. 206
 - *melanodon* Boiss. 160, 161, 172
 - *memnonius* Maass. & Podl. 184, 185
 - *mollis* M.Bieb. 160, 184
 - *nahavandicus* Maass. 196, 197
 - *patrius* Maass. 177
 - *pauperiflorus* Bornm. 160, 171
 - *perdurabilis* Maass. 181, 182 *
 - *plebejus* Boiss. 178
 - *podocarpus* C.A.Mey. 160, 211, 212
 - - var. *leucotrichus* Bornm. & Gauba 212
 - *pseudoantilibani* Maass. 184, 189 *
 - *pseudomacrostachys* Maass. 211 *
 - *pseudopulchellus* Maass. 168, 170 *
 - *pulchellus* Boiss. 158, 166, 168
 - *rawlinsianus* Aitch. & Baker 194
 - *rivashensis* Maass. 198
 - *rudimentus* Maass. 171
 - *rusticus* Maass. 174, 175
 - *saccatus* Boiss. 199, 200
 - *sarae* Eig 196, 197

- senilis Bornm. 166
- shahpouricus Parsa 210
- spachianus Boiss. & Buhse 199
- stenocalyx Eig 204
- stenostachys Beck 208
- stridii Kit Tan 175
- suluklensis Freyn & Sint. 160, 184,
190
- tabrisianus E.Sheld. 207
- takhtadzhani Grossh. 160, 184, 186
- tenuiscapus Freyn & Bornm. 160, 173
- termeanus Maass. & Podlech 160, 213,
214
- typhaeformis Maass. 184, 185
- vessalae Maass. & Podlech, 208, 2097